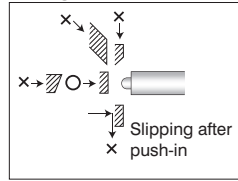


Precision Limit Switches

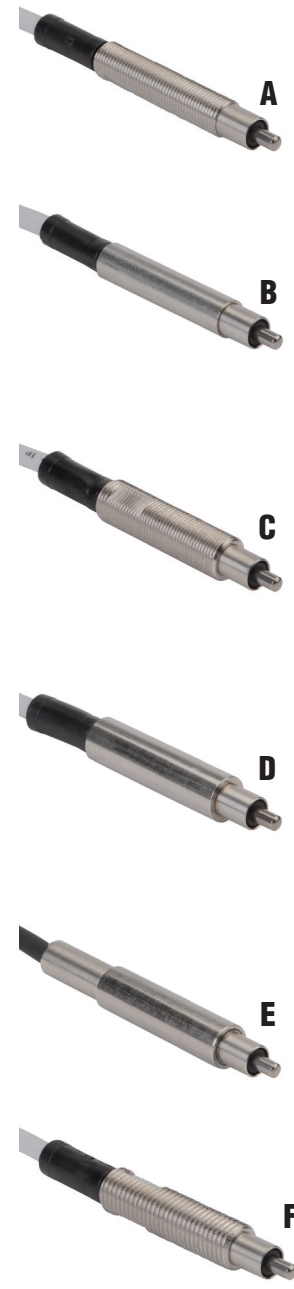
Precision Touch Limit Switches

- Slim design (from M5) allows side-by-side installation
- Long-stroke and water-resistant models available
- 5 micron (μm) repeat accuracy
- Stainless steel housing
- Metal bearing
- Straight-touch and straight needle touch available

Straight Touch



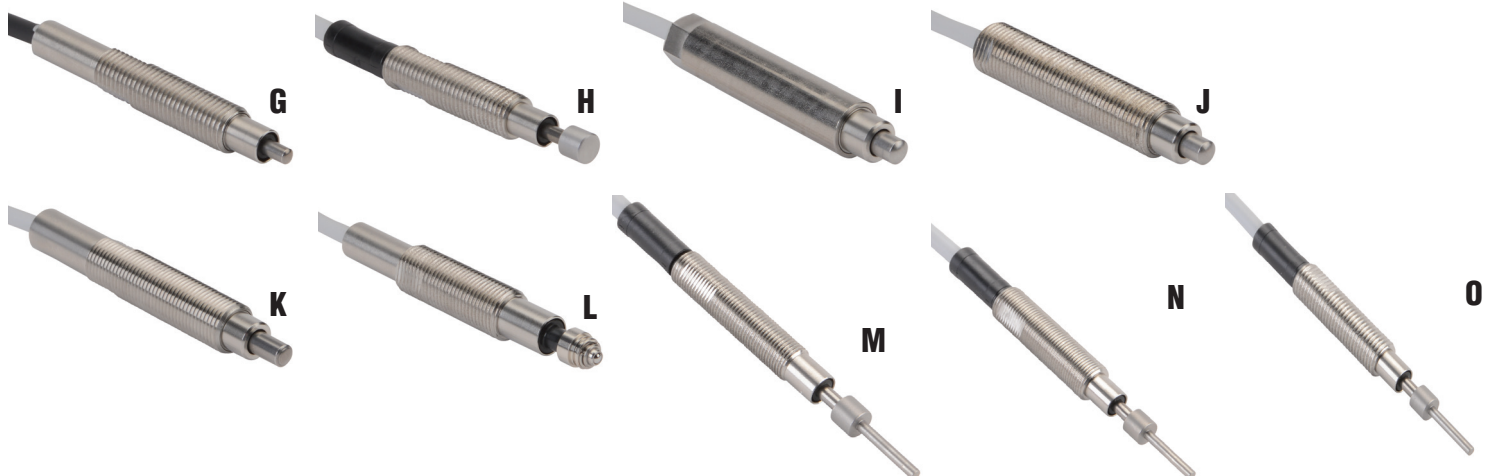
O indicates correct target approach and orientation.
 X indicates approach and orientation that should be avoided.



| Precision Touch Limit Switches Selection Chart | | | | | | | | | | | | | | | | | |
|--|---------|---------------------------|-------------|--------------------------|--------|------------------|---------------|------------------|------------------|----------|----------|-----------|----------|-----------|----------|-----------|------|
| Part Number | Price | Actuator/ Head Type* | Barrel Type | Barrel Diameter/ Thread* | Stroke | Switching Output | Contact Force | Sensor Dimension | Connection Type | Photo | | | | | | | |
| Straight Touch | | | | | | | | | | | | | | | | | |
| CSJ055A-L | \$45.50 | Ø 2mm plunger, SR 1.5 mm | Threaded | M5x0.5 | 2.8 mm | N.O. | 1N | Figure 1 | Cable, 3m length | A | | | | | | | |
| CSJS50A-L | \$45.50 | | Smooth | Ø 5mm | | | | Figure 2 | | B | | | | | | | |
| CS065A-L | \$51.00 | | Threaded | M6x0.5 | | | | Figure 3 | | C | | | | | | | |
| CSS60A-L | \$47.00 | | Smooth | Ø 6mm | | | | Figure 4 | | D | | | | | | | |
| CSS60B-L | \$47.00 | | Threaded | M6x0.75 | | | | Figure 5 | | E | | | | | | | |
| CS067A-L | \$51.00 | | | | | | | | | N.C. | F | | | | | | |
| CS067B-L | \$51.00 | N.O. | | | G | | | | | | | | | | | | |
| CS067A-BL | \$55.00 | Ø 2mm plunger, Ø 4mm flat | Smooth | Ø 8mm | 5mm | N.O. | Figure 6 | Figure 7 | Figure 8 | H | | | | | | | |
| CSS80A-L | \$47.00 | Ø 3.5 mm plunger, SR 3mm | | | | | | | | Threaded | M8x0.75 | N.C. | Figure 9 | Figure 10 | Figure 9 | Figure 10 | I |
| CS087A-L | \$51.00 | | | | | | | | | | | | | | | | N.O. |
| CSK087A-L | \$57.00 | Ø 2mm ball | Threaded | M8x0.75 | N.C. | Figure 9 | Figure 10 | Figure 9 | Figure 10 | K | | | | | | | |
| CSK087B-L | \$57.00 | | | | | | | | | N.O. | Figure 9 | Figure 10 | Figure 9 | Figure 10 | Figure 9 | Figure 10 | L |
| CSP087A-AL | \$65.00 | Ø 2mm ball | Threaded | M8x0.75 | N.C. | Figure 9 | Figure 10 | Figure 9 | Figure 10 | | | | | | | | L |
| CSP087B-AL | \$65.00 | | | | | | | | | N.C. | Figure 9 | Figure 10 | Figure 9 | Figure 10 | Figure 9 | Figure 10 | L |
| Straight Needle Contact Touch | | | | | | | | | | | | | | | | | |
| CSJ055A-CL | \$51.00 | 1.5mm flat | Threaded | M5x0.5 | 2.8 mm | N.O. | 1N | Figure 11 | Cable, 3m length | M | | | | | | | |
| CS065A-CL | \$57.00 | | | M6x0.5 | | | | Figure 12 | | N | | | | | | | |
| CS067A-CL | \$70.00 | | | M6x0.75 | | | | Figure 13 | | O | | | | | | | |

* Ø = diameter, SR = surface radius

-L: LED indicator (mounted in cable 120mm from the switch)



Precision Limit Switches Dimensions

Precision Touch: CS / CSJ / CSS / CSK / CSP Series

Dimensions

mm [inches]

Figure 1
CSJ055A-L

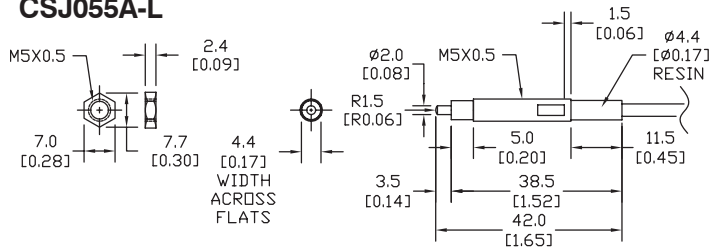


Figure 2
CSJS50A-L

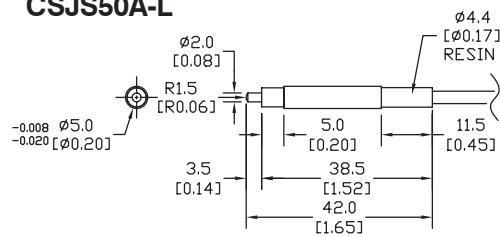


Figure 3
CS065A-L

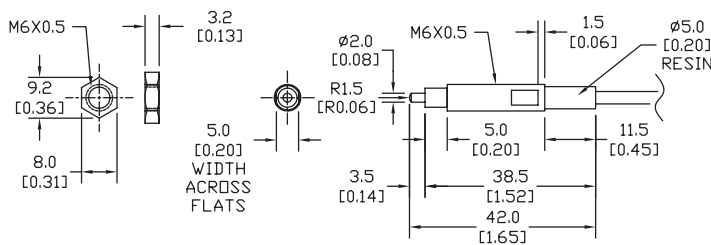


Figure 4
CSS60A-L / CSS60B-L

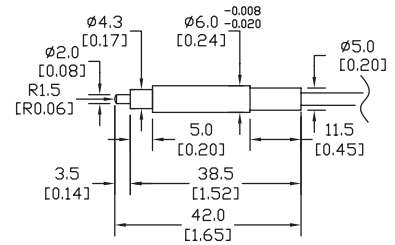


Figure 5
CS067A-L / CS067B-L

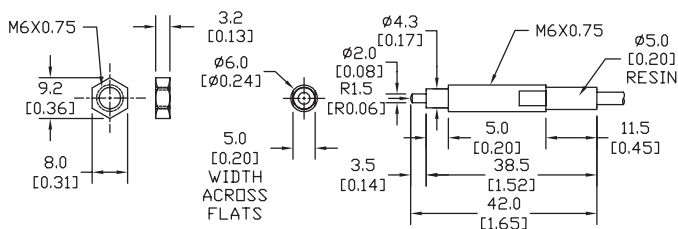
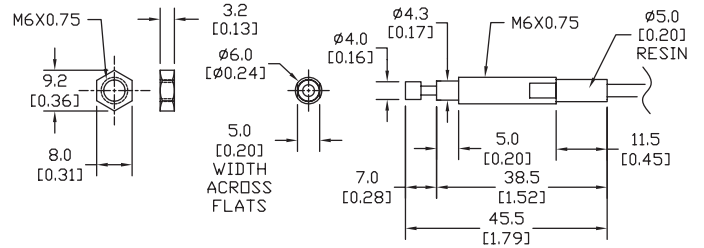


Figure 6
CS067A-BL



See our website, www.AutomationDirect.com, for complete Engineering drawings.

Precision Limit Switches Dimensions

Precision Touch: CS / CSJ / CSS / CSK / CSP (continued)

Dimensions

mm [inches]

Figure 7
CSS80A-L

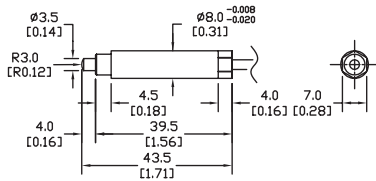


Figure 8
CS087A-L

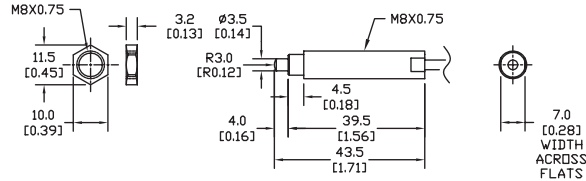


Figure 9
CSK087A-L / CSK087B-L

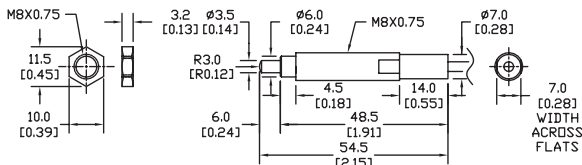


Figure 10
CSP087A-AL / CSP087B-AL

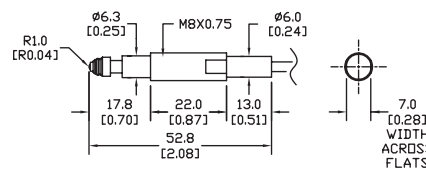


Figure 11
CSJ055A-CL

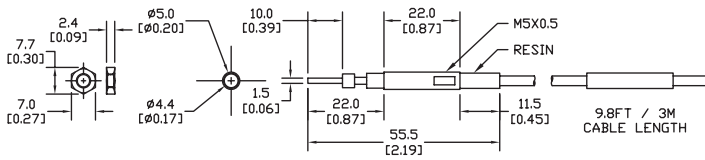


Figure 12
CS065A-CL

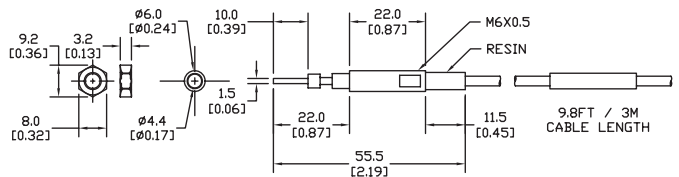
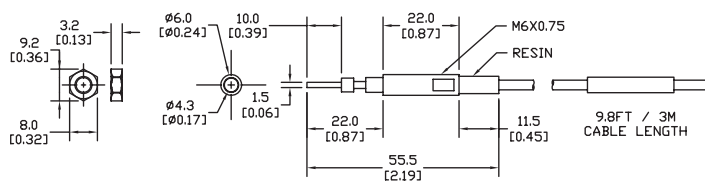


Figure 13
CS067A-CL



See our website, www.AutomationDirect.com, for complete Engineering drawings.

Precision Limit Switches

| Precision Touch Limit Switches Specifications | | | | | |
|---|---|-----|-----|-----|-----|
| | Straight Touch Switches | | | | |
| | CS | CSJ | CSS | CSK | CSP |
| Environmental | | | | | |
| Degree of Protection | IP65 | | | | |
| Temperature Range | Operating: 0–80°C (32–176°F) (Ice-free) | | | | |
| Mechanical Ratings | | | | | |
| Enclosure Material | Stainless Steel | | | | |
| Pretravel | 0.3 mm | | | | |
| Torque (for nuts on threaded barrels, set screws on smooth barrels) | 4Nm | 2Nm | N/A | N/A | 7Nm |
| Oscillation | 10–55Hz total amplitude 1.5 for X, Y, Z each direction | | | | |
| Impact | 300 m/s ² for X, Y, Z each direction | | | | |
| Repeat Accuracy | 5 micron (µm) | | | | |
| Recommended Minimum Operating Speed | 10 mm/minute | | | | |
| Electrical Ratings | | | | | |
| Contact Life | 10 million operations | | | | |
| Contact Voltage | 5–24VDC | | | | |
| Steady Current Rating | 10mA or less | | | | |
| Max In-rush Current Rating | 10mA (limit current to protect LED indicator) | | | | |
| Connection Type | Cable: 3m (2m for CSHP series) Oil resistant Ø2.8/2 cores, Tensile strength 30N, minimum bending R7 | | | | |
| Indicating | -L: LED indicator (mounted in cable 120mm from the switch) | | | | |

* At operating speed 50-200 mm/minute. Operating speed slower than 10 mm/min is not recommended.

Circuit Diagrams

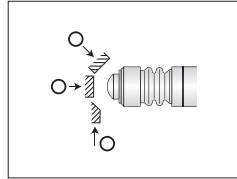
| Without LED | With LED |
|-------------------------------|--|
| <p>Normally open (N.O.)</p> | <p>Normally open (N.O.)</p> <p>LED Normally Off</p> |
| <p>Normally closed (N.C.)</p> | <p>Normally closed (N.C.)</p> <p>LED Normally On</p> |

Precision Limit Switches

Precision Angled and Mini Touch Limit Switches

- Mini size suitable for machines required to be small and for narrow installation space.
- Stroke length (1.5 mm)
- 3 and 5 micron (μm) repeat accuracy
- Stainless steel housing
- Metal bearing

Angled/Sliding Touch



○ indicates correct target approach and orientation.
 × indicates approach and orientation that should be avoided.



| Precision Touch Limit Switches Selection Chart | | | | | | | | | | |
|--|----------|---------------------------------|-------------|--------------------------|--------|------------------|---------------|------------------|------------------------|-------|
| Part Number | Price | Actuator/ Head Type* | Barrel Type | Barrel Diameter/ Thread* | Stroke | Switching Output | Contact Force | Sensor Dimension | Connection Type | Photo |
| Precision Angled | | | | | | | | | | |
| CSHP085A-L | \$134.00 | Ø 4.7 mm SR 3mm | Threaded | M8x0.5 | 2.8 mm | N.O. | 1N | Figure 1 | Cable, 2m length | A |
| CSHP085B-L | \$134.00 | | | | | N.C. | | | | |
| Precision Mini | | | | | | | | | | |
| CSM105WA | \$48.50 | Ø 3.5mm plunger | Threaded | M10x0.5 | 1.5 mm | N.O. | 1N | Figure 2 | Core wire 0.5 m length | B |
| CSMP105WA | \$51.00 | 2mm plunger with boot/ SR 2.5mm | | | | | | Figure 3 | | C |

* Ø = diameter, SR = surface radius

-L: LED indicator (mounted in cable 120mm from the switch)

Precision Touch: CSHP/CSM Series Dimensions

mm [inches]

Figure 1
CSHP085A-L / CSHP085B-L

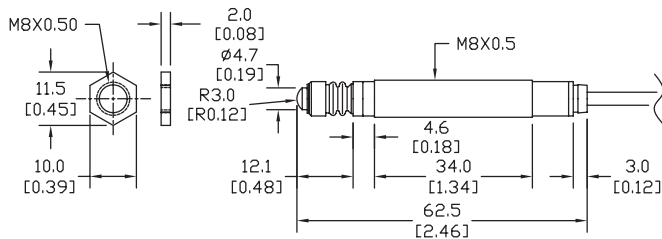


Figure 2
CSM105WA

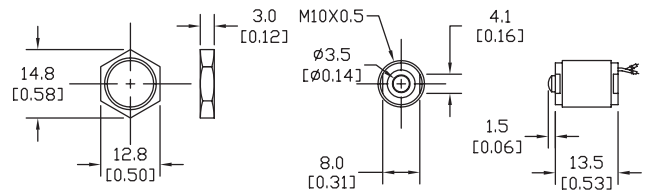
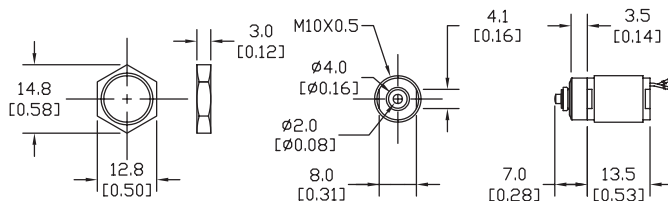


Figure 3
CSMP105WA



Precision Limit Switches

| Precision Touch Limit Switches Specifications | | |
|---|---|---|
| | Precision Angled | Precision Mini |
| | CSHP | CSM |
| Environmental | | |
| Degree of Protection | IP67 | |
| Temperature Range | Operating: 0–80°C (32–176°F) (Ice-free) | |
| Mechanical Ratings | | |
| Enclosure Material | 303 Stainless Steel | |
| Pretravel | 0.3 mm | |
| Torque (for nuts on threaded barrels, set screws on smooth barrels) | 4Nm | 8Nm |
| Oscillation | 10–55Hz total amplitude 1.5 for X, Y, Z each direction | |
| Impact | 300 m/s ² for X, Y, Z each direction | |
| Repeat Accuracy | Both On–Off, Off–On: 0.005 mm* | Both On–Off, Off–On: 0.003 mm* |
| Recommended Minimum Operating Speed | 10 mm/minute | |
| Electrical Ratings | | |
| Contact Life | 10 million operations | |
| Contact Voltage | 5–24VDC | |
| Steady Current Rating | 10mA or less | |
| Max In-rush Current Rating | 10mA (limit current to protect LED indicator) | |
| Connection Type | Cable: 3m (2m for CSHP series) Oil resistant Ø2.8/2 cores, Tensile strength 30N, minimum bending R7 | Core wire cable, 0.5 m (x2) Oil resistant Ø0.6 Tensile strength 15W |
| Indicating | -L: LED indicator (mounted in cable 120mm from the switch) | NA |

* At operating speed 50-200 mm/minute. Operating speed slower than 10 mm/min is not recommended.

Circuit Diagrams

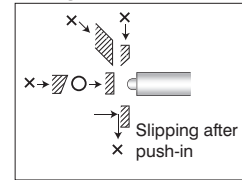
| Without LED | With LED |
|-------------------------------|-------------------------------|
| <p>Normally open (N.O.)</p> | <p>Normally open (N.O.)</p> |
| <p>Normally closed (N.C.)</p> | <p>Normally closed (N.C.)</p> |

Precision Limit Switches

Precision Touch Limit Switches

- Ultra-small design (M5 or Ø5)
- 3 micron (µm) repeat accuracy
- No movement differential
- Dustproof / water-resistant (IP67) models available
- Stainless steel housings
- Metal bearing

Straight Touch

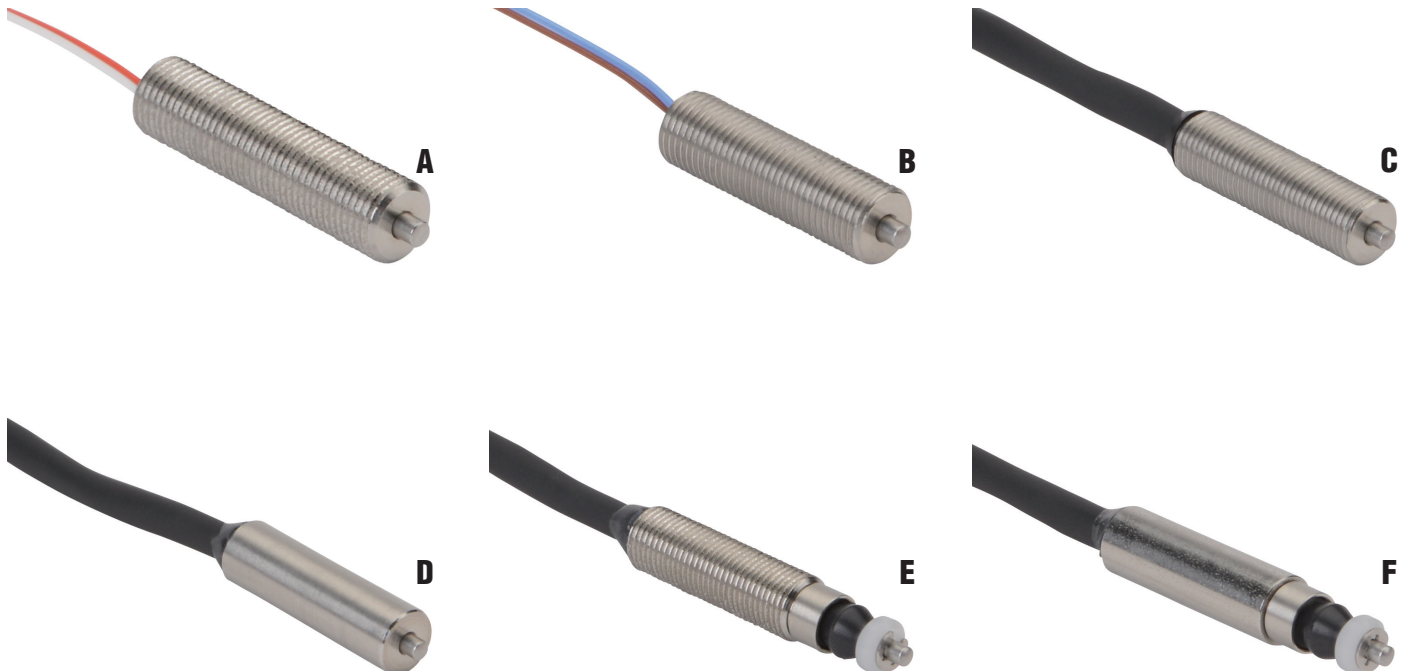


O indicates correct target approach and orientation.
 X indicates approach and orientation that should be avoided.

| Precision Touch Limit Switches Selection Chart | | | | | | | | | | |
|--|---------|--------------------------|------------------|-------------------------|--------|------------------|---------------|------------------|------------------------|----------|
| Part Number | Price | Actuator/Head Type* | Barrel Type | Barrel Diameter/Thread* | Stroke | Switching Output | Contact Force | Sensor Dimension | Connection Type | Photo |
| Straight Touch | | | | | | | | | | |
| PT5M3WA | \$61.00 | Ø 1.5 mm plunger, SR 2mm | Threaded | M5x0.5 | 1.5 mm | N.O. | 0.5 N | Figure 1 | Core wire, 0.5m length | A |
| PT5M3WB | \$61.00 | | | | | | | Figure 2 | | B |
| PT5M3CB-L | \$72.00 | | Cable, 2m length | Smooth | | Ø 5mm | | N.C. | 0.8 N | Figure 3 |
| PT5S3CB-L | \$68.00 | | | | | | Figure 4 | | | D |
| PTP5M3CB-L | \$79.00 | | | Threaded | | M5x0.5 | Figure 5 | E | | |
| PTP5S3CB-L | \$74.00 | | | Smooth | | Ø 5mm | Figure 6 | F | | |

* Ø = diameter, SR = surface radius

-L: LED indicator (mounted in cable 120mm from the switch)



Precision Limit Switches Dimensions

Precision Touch: PT / PTP Series

Dimensions

mm [inches]

Figure 1
PT5M3WA

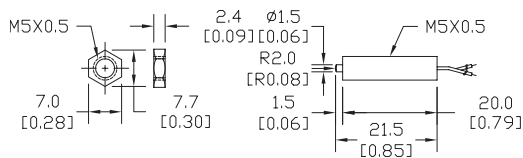


Figure 2
PT5M3WB

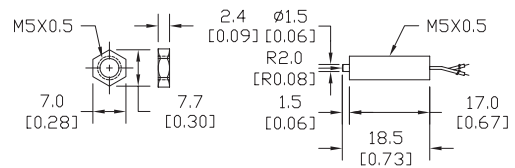


Figure 3
PT5M3CB-L

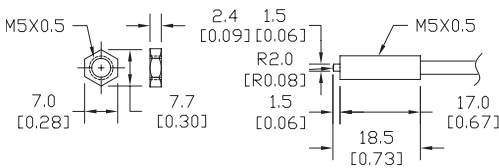


Figure 4
PT5S3CB-L

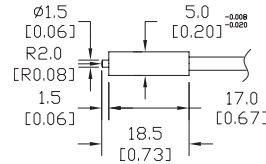


Figure 5
PTP5M3CB-L

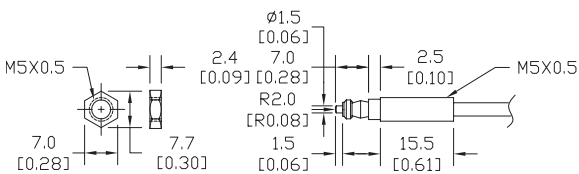
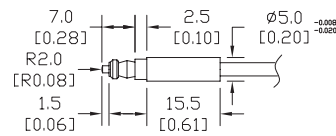


Figure 6
PTP5S3CB-L



See our website, www.AutomationDirect.com, for complete Engineering drawings.

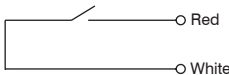
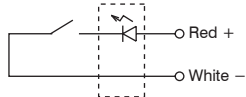
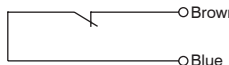
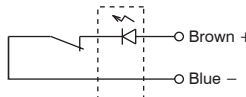
Precision Limit Switches

| Precision Touch Limit Switches Specifications | | |
|--|---|----------|
| | PT5x3xx | PTP5x3CB |
| Environmental | | |
| Degree of Protection | IP40 | IP67 |
| Temperature Range | Operating: 0–80°C (32–176°F) (Ice-free) | |
| Mechanical Ratings | | |
| Enclosure Material | 303 Stainless Steel | |
| Pretravel | 0* (PT5M3WA: about 0.3 mm) | |
| Torque (for nuts on threaded barrels, set screws on smooth barrels) | 1 N·m | |
| Oscillation | 10–55Hz total amplitude 1.5 for X, Y, Z each direction | |
| Impact | 300 m/s ² for X, Y, Z each direction | |
| Electrical Ratings | | |
| Contact Life | 3 million operations | |
| Repeat Accuracy | Both On–Off, Off–On: 0.003 mm** | |
| Recommended Minimum Operating Speed | 10 mm/minute | |
| Contact Voltage | 5–24VDC | |
| Steady Current Rating | 10mA or less | |
| Max In-rush Current Rating | 20mA without LED indicator, 10mA with LED indicator. | |
| Connection Type | PTxxxWx: Core-wire cable, 0.5m (x2) Oil resistant Ø0.6 Tensile strength 15N. PTxxxCB: Cable, 2m Oil-resistant Ø2.8/2 cores Tensile strength 30N, Minimum bending R7. | |
| Indicating | -L: LED indicator (mounted in cable 120mm from the switch) | |

* Adjust the installed location of the switch by the signal switching point.

** At operating speed 50-200 mm/minute. Operating speed slower than 10 mm/min is not recommended.

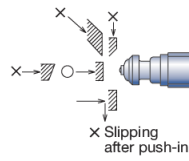
Circuit Diagrams

| Without LED | With LED |
|---|--|
| <p>Normally open (N.O.)</p>  | <p>Normally open (N.O.)</p>  <p>LED Normally Off</p> |
| <p>Normally closed (N.C.)</p>  | <p>Normally closed (N.C.)</p>  <p>LED Normally On</p> |

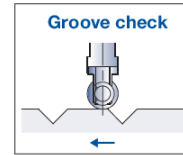
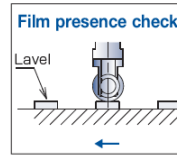
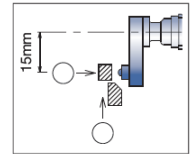
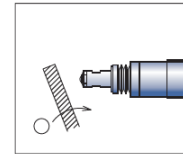
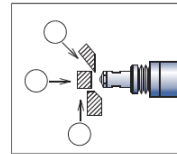
Precision Limit Switches

High Precision Touch and Tool Setter Switches

- 0.5 micron (μm) repeat accuracy
- No movement differential
- No temperature drift
- Dustproof / water-resistant (IP67)
- LED indicator
- Stainless steel



P085DB-AL
P10DA-AL
P10DB-AL
P10DLB-AL



P10DHA-TML
P10DHB-TML
P10DHLTB-TML

○ indicates correct target approach and orientation.
 ✕ indicates approach and orientation that should be avoided.

High Precision Touch and Tool Setter Switches Selection Chart

| Part Number | Price | Actuator/Head Type* | Barrel Type | Barrel Diameter/Thread | Stroke | Switching Output | Contact Force | Sensor Dimensions | Connection Type |
|---|----------|-----------------------------|-------------|------------------------|--------|------------------|---------------|-------------------|--------------------|
| Straight Touch | | | | | | | | | |
| P085DB-AL | \$125.00 | Ø 5.5 mm plunger, SR 1.0 mm | Threaded | M8×0.5 | 3mm | N.C. | 1N | Figure 1 | 3m (9.84 ft) cable |
| P10DB-AL | \$125.00 | Ø 8.5 mm plunger, SR 1.0 mm | Threaded | M10×0.5 | 3mm | N.C. | 1N | Figure 2 | 3m (9.84 ft) cable |
| P10DA-AL | \$125.00 | Ø 8.5 mm plunger, SR 1.0 mm | Threaded | M10×0.5 | 3mm | N.O. | 1N | Figure 3 | 3m (9.84 ft) cable |
| P10DLB-AL | \$126.00 | Ø 8.5 mm plunger, SR 1.0 mm | Threaded | M10×0.5 | 3mm | N.C. | 1N | Figure 4 | 3m (9.84 ft) cable |
| Straight Touch With Ball Bearing | | | | | | | | | |
| P10DHA-TML | \$263.00 | Ø 2.5 mm plunger, SR 2.0 mm | Threaded | M14×0.5 | 3mm | N.O. | 1N | Figure 5 | 3m (9.84 ft) cable |
| P10DHB-TML | \$263.00 | Ø 2.5 mm plunger, SR 2.0 mm | Threaded | M14×0.5 | 3mm | N.C. | 1N | Figure 6 | 3m (9.84 ft) cable |
| P10DHLTB-TML | \$289.00 | Ø 2.5 mm plunger, SR 2.0 mm | Threaded | M14×0.5 | 10mm | N.C. | 1N | Figure 7 | 3m (9.84 ft) cable |

* Ø = diameter, SR = surface radius

-xL: LED indicator (mounted in cable 120mm from the switch)



P085DB-AL



P10DB-AL



P10DA-AL



P10DLB-AL



P10DHA-TML



P10DHB-TML



P10DHLTB-TML

Precision Limit Switches Dimensions

High Precision Touch and Tool Setter Switches: P08 / P10 Series

Dimensions

mm [inches]

Figure 1
P085DB-AL

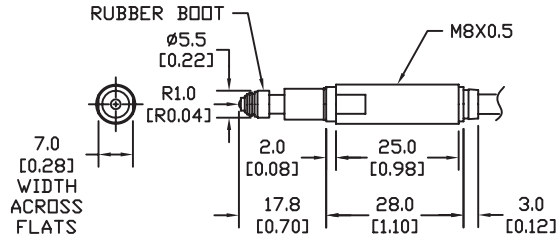


Figure 2
P10DB-AL

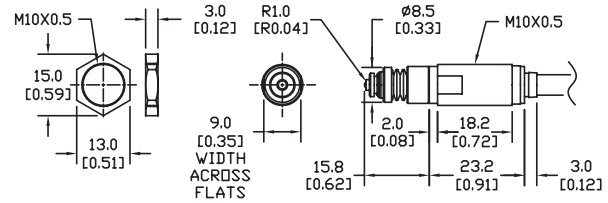


Figure 3
P10DA-AL

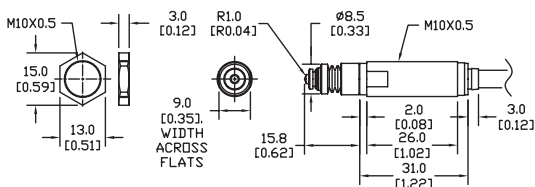


Figure 4
P10DLB-AL

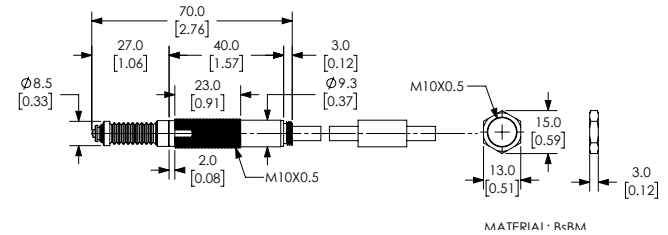


Figure 5
P10DHA-TML

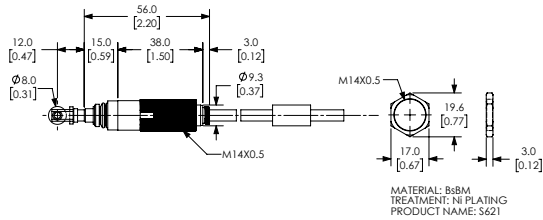


Figure 6
P10DHB-TML

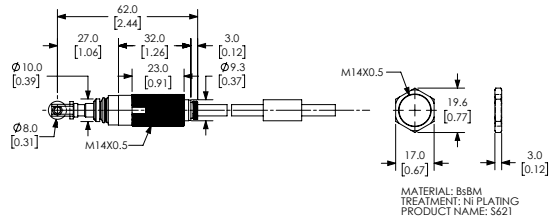
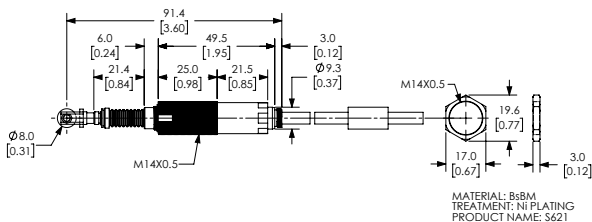


Figure 7
P10DHLTB-TML



See our website, www.AutomationDirect.com, for complete Engineering drawings.

Precision Limit Switches

High Precision Touch and Tool Setter Switches: P08 / P10 Series

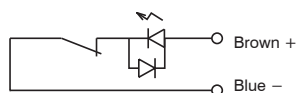
| High Precision Touch and Tool Setter Switches Specifications | | | | |
|--|---|----------------------------|---------------------|------|
| | P08 | P10 | PDH | PDHL |
| Environmental | | | | |
| Degree of Protection | IP67 | | | |
| Temperature Range | Operating: 0–80°C (32–176°F) (Ice-free) | | | |
| Mechanical Ratings | | | | |
| Enclosure Material | 303 Stainless Steel | | | |
| Pretravel | 0* | P10DA: 0.2 mm P10DB: 0* | | 0* |
| Torque (for nuts on threaded barrels, set screws on smooth barrels) | 4 N•m (2.95 lb•ft) | 8 N•m (5.90 lb•ft) | 10 N•m (7.38 lb•ft) | |
| Oscillation | 10–55Hz total amplitude 1.5 for X, Y, Z each direction | | | |
| Impact | 300 m/s ² for X, Y, Z each direction | | | |
| Repeat Accuracy | Both On–Off, Off–On: 0.0005 mm (range)** | | | |
| Recommended Minimum Operating Speed | 10 mm/minute | | | |
| Electrical Ratings | | | | |
| Contact Life | 3 million operations | | | |
| Contact Voltage | 5–24VDC | | | |
| Steady Current Rating | 10mA or less | | | |
| Max In-rush Current Rating | 10mA (limit current to protect LED indicator) | | | |
| Connection Type | Cable: 3m Oil resistant Ø5/2 cores (P08: Ø4/2 cores), tensile strength 30N, minimum bending R7, 20AWG | | | |
| Indicating | -L: LED indicator (mounted in cable 120mm from the switch) | | | |

* Adjust the installed location of the switch by the signal switching point.

** At operating speed 50-200 mm/minute. Operating speed slower than 10 mm/min is not recommended.

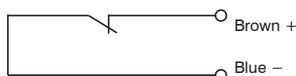
Circuit Diagrams

Normally open (N.O.)



LED Normally Off

Normally closed (N.C.)



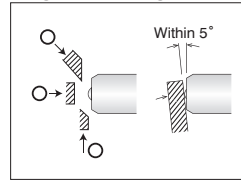
LED Normally On

Precision Limit Switches

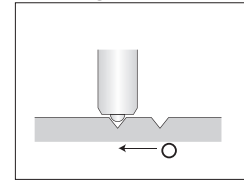
Ball Plunger Limit Switches

- Indexing positioning ball plunger combined with touch switch for confirmation signal
- Dual function reduces number of components required
- 10 micron (μm) repeat accuracy
- Angled/Sliding Touch
- Higher contact force ideal for indexing

Angled/Sliding Touch



Indexing Touch



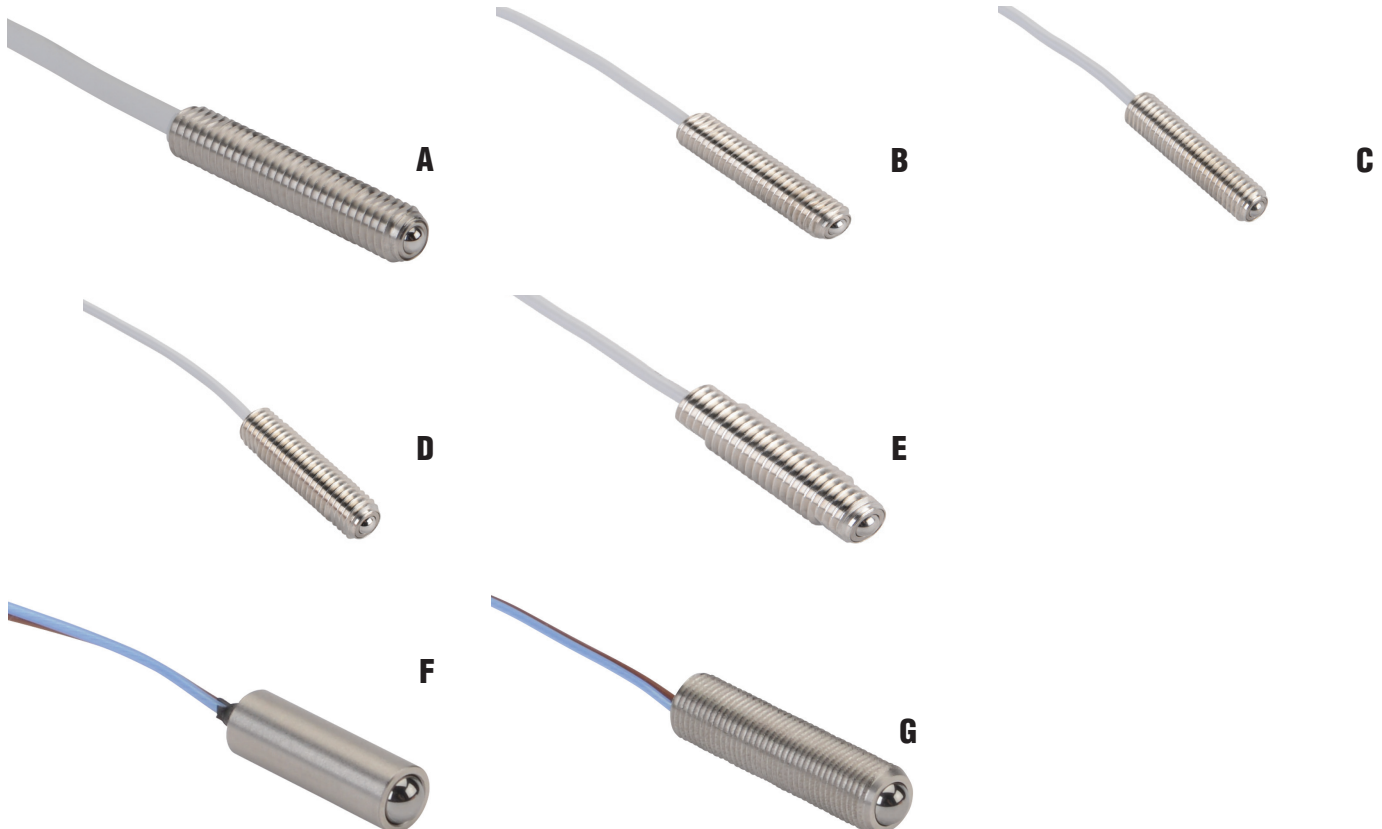
○ indicates correct target approach and orientation.
 × indicates approach and orientation that should be avoided.

Ball Plunger Limit Switches Selection Chart

| Part Number | Price | Actuator/Head Type* | Barrel Type | Barrel Diameter/Thread* | Stroke | Switching Output | Contact Force | Sensor Dimension | Connection Type | Photo |
|--------------------------------------|---------|---------------------|-------------|-------------------------|--------|------------------|---------------|------------------------|------------------|-------|
| Indexing/Angled/Sliding Touch | | | | | | | | | | |
| BP060A-L | \$43.00 | Ø 3mm ball | Threaded | Ø M6×1.0 | 0.8 mm | N.O. | 8N (Max. 13N) | Figure 1 | Cable, 2m length | A |
| BP060A-LF | \$43.00 | | | | | | 1N | | | |
| BP080A-L | \$51.00 | Ø 4mm ball | | Ø M8×1.25 | 1mm | | 8-16N | Figure 2 | | B |
| BP080A-LF | \$51.00 | | | | | | 1N | | | |
| BP100A-L | \$54.00 | Ø 5mm ball | | Ø M10×1.5 | 1.2 mm | | 10-20N | Figure 3 | | D |
| BP100A-LF | \$54.00 | | | | | | 1N | | | |
| BP4SWA | \$61.00 | Ø 3mm ball | Smooth | Ø 4mm | 0.8 mm | 1N | Figure 4 | Core wire, 0.5m length | F | |
| BP5MWA | \$57.00 | | Threaded | M5×0.5 | 1mm | | Figure 5 | | G | |

* Ø = diameter

-L: LED indicator (mounted in cable 120mm from the switch)



Precision Limit Switches Dimensions

Ball Plunger: BP / BP4S / BP5M Series

Dimensions

mm [inches]

Figure 1
BP060A-L / BP060A-LF

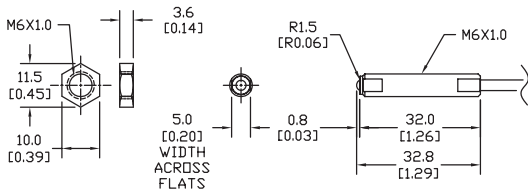


Figure 2
BP080A-L / BP080A-LF

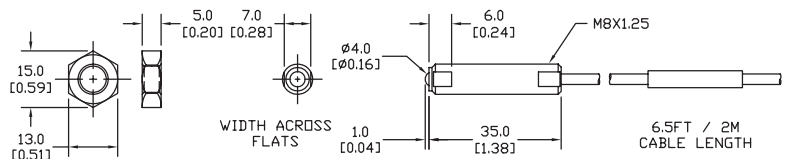


Figure 3
BP100A-L / BP100A-LF

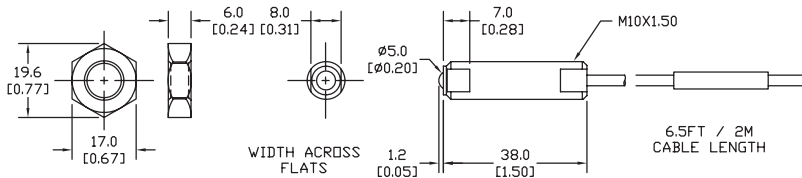


Figure 4
BP4SWA

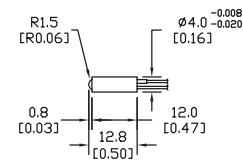
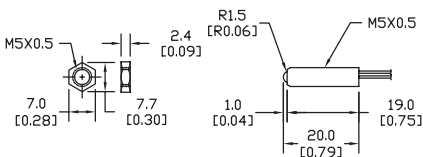


Figure 5
BP5MWA



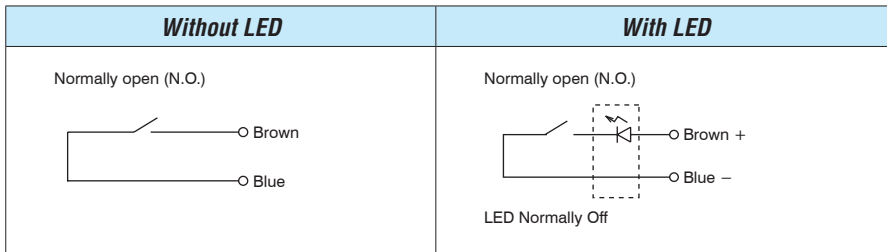
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Precision Limit Switches

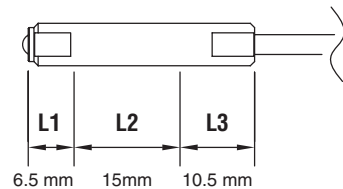
| Ball Plunger Limit Switches Specifications | | | | | |
|---|---|--------|--------|--|----------------------|
| | BP060A | BP080A | BP100A | BP4SWA | BP5MWA |
| Environmental | | | | | |
| Degree of Protection | IP40 | | | | |
| Temperature Range | Operating: 0–80°C (32–176°F) (Ice-free) | | | | |
| Mechanical Ratings | | | | | |
| Enclosure Material | 303 Stainless Steel | | | | |
| Pretravel | 0.3 mm | | | | |
| Torque (for nuts on threaded barrels, set screws on smooth barrels) | See Torque Limit Figure | | | NA | 1Nm |
| Oscillation | 10–55Hz total amplitude 1.5 for X, Y, Z each direction | | | | |
| Impact | 300 m/s ² for X, Y, Z each direction | | | | |
| Repeat Accuracy | Both On–Off, Off–On: 0.01 mm (range)(axial direction)* | | | | |
| Recommended Minimum Operating Speed | 10 mm/minute | | | | |
| Electrical Ratings | | | | | |
| Contact Life | 3 million operations | | | 1 million operations | 3 million operations |
| Contact Voltage | 5–24VDC | | | | |
| Steady Current Rating | 10mA or less | | | | |
| Max In-rush Current Rating | 10mA (limit current to protect LED indicator) | | | 20mA | |
| Connection Type | Cable: 2m Oil resistant Ø2.8/2 cores, Tensile strength 30N, minimum bending R7. | | | Core wire cable: 0.5m (x2), Oil resistant, Ø0.66, Tensile strength 15N | |
| Indicating | -L: LED indicator (mounted in cable 120mm from the switch) | | | N/A | |

* At operating speed 50-200 mm/minute. Operating speed slower than 10 mm/min is not recommended.

Circuit Diagrams



Torque Limits



Tightening torque for case screws and nuts

| Applicable model | L1 | | L2 | | L3 | |
|------------------|--------|-------------------|--------|-------------------|--------|-------------------|
| | length | Tightening torque | length | Tightening torque | length | Tightening torque |
| BP060A | 6.5 | 2.5N·m | 15 | 5N·m | 10.5 | 2.5N·m |
| BP080A | 8 | 5N·m | 21.5 | 10N·m | 5.5 | 5N·m |
| BP100A | 6.5 | 15N·m | 22.5 | 25N·m | 9 | 15N·m |

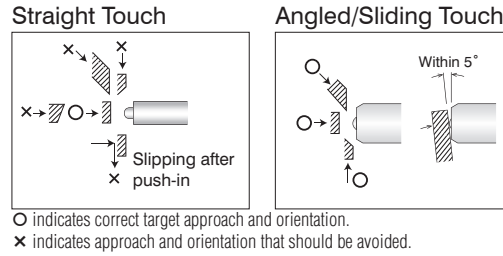
Caution

Use the lower torque (i.e. torque corresponding to L1 and L3) while tightening the bolt between lengths L1 and L2 or L2 and L3 in the picture. Please make sure to use a locknut if the bolt is likely to shift in position due to the vibrational impacts.

Precision Limit Switches

High Temperature Precision Limit Switches

- Operating up to 200°C
- Straight Touch or Angled/Sliding Touch
- Ball plunger model provides higher contact force ideal for indexing/positioning
- 10 micron (μm) repeat accuracy
- No movement differential
- No temperature drift



| High Temperature Precision Limit Switches Selection Chart | | | | | | | | | | |
|---|----------|--------------------------|-------------|------------------------|--------|------------------|---------------|------------------|------------------|-------|
| Part Number | Price | Actuator/Head Type* | Barrel Type | Barrel Diameter/Thread | Stroke | Switching Output | Contact Force | Sensor Dimension | Connection Type | Photo |
| Straight Touch | | | | | | | | | | |
| CS067A-HT2 | \$210.00 | Ø 2mm plunger, SR 1.5 mm | Threaded | M6×0.75 | 2.8 mm | N.O. | 1N | Figure 1 | Cable, 2m length | A |

* Ø = diameter, SR = surface radius



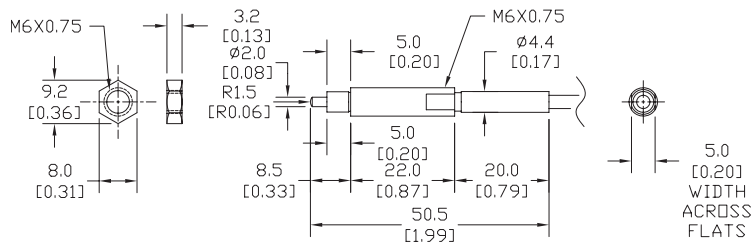
Precision Limit Switches Dimensions

High Temperature: HT Series

Dimensions

mm [inches]

Figure 1
CS067A-HT2



See our website, www.AutomationDirect.com, for complete Engineering drawings.

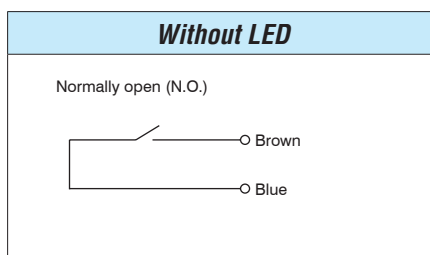
Precision Limit Switches

| High Temp Precision Limit Switches Specifications | |
|--|--|
| Environmental | |
| Degree of Protection | IP65** |
| Temperature Range | Operating: 0–200°C (32–392°F) (Ice-free) |
| Mechanical Ratings | |
| Enclosure Material | Stainless Steel |
| Pretravel | 0.3 mm |
| Torque (for nuts on threaded barrels, set screws on smooth barrels) | 4 N·m |
| Oscillation | 10–55Hz total amplitude 1.5 for X, Y, Z each direction |
| Impact | 300 m/s ² for X, Y, Z each direction |
| Electrical Ratings | |
| Contact Life | 3 million operations |
| Repeat Accuracy | Both On–Off, Off–On: 0.01 mm* ** |
| Recommended Minimum Operating Speed | 10 mm/minute |
| Contact Voltage | 5–24VDC |
| Steady Current Rating | 10mA or less |
| Max In-rush Current Rating | 20mA |
| Connection Type | Cable: 2m Heat resistant Ø2.8/2 cores |
| Indicating | N/A |

* At operating speed 50-200 mm/minute. Operating speed slower than 10 mm/min is not recommended.

** At normal temperature (0–80°C [32–176°F]).

Circuit Diagrams



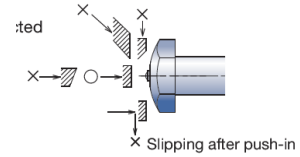
Precision Limit Switches

Stopper Bolt Precision Limit Switches

Stopper bolt precision limit switches incorporate a mechanical stop along with the limit switch function, eliminating the need for a separate mechanical stop in many situations.

- 2 tasks with one device
- Housing a high-accuracy built-in switch in a stopper bolt
- Provides higher contact force ideal for indexing/positioning
- 10 micron (μm) repeat accuracy
- No movement differential
- No temperature drift
- Stainless steel

Stopper Bolt



○ indicates correct target approach and orientation.
 × indicates approach and orientation that should be avoided.

| Stopper Bolt Precision Limit Switches Selection Chart | | | | | | | | | |
|---|---------|-------------------------------------|-------------|------------------------|--------|------------------|---------------|------------------|--------------------|
| Part Number | Price | Actuator/Head Type* | Barrel Type | Barrel Diameter/Thread | Stroke | Switching Output | Contact Force | Sensor Dimension | Connection Type |
| Stopper Bolt | | | | | | | | | |
| STP100UA-L | \$63.00 | Ø 5.5mm plunger with upward cover | Threaded | M10×1.5 | 0.7mm | N.O. | 4N | Figure 1 | 2m (6.56 ft) cable |
| STP100DA-L | \$63.00 | Ø 5.5mm plunger with downward cover | Threaded | M10×1.5 | 0.7mm | N.O. | 4N | Figure 2 | 2m (6.56 ft) cable |
| STS060PA-L | \$39.00 | Ø 1.5mm plunger | Threaded | M6×1.0 | 0.7mm | N.O. | 2N | Figure 3 | 2m (6.56 ft) cable |
| STS080PA-L | \$51.00 | Ø 1.5mm plunger | Threaded | M8×1.25 | 0.7mm | N.O. | 2N | Figure 4 | 2m (6.56 ft) cable |
| STS100PA-L | \$54.00 | Ø 1.5mm plunger | Threaded | M10×1.5 | 0.7mm | N.O. | 2N | Figure 5 | 2m (6.56 ft) cable |
| STE060PA-L | \$42.00 | Ø 1.5mm plunger | Threaded | M6×1.0 | 0.7mm | N.O. | 2N | Figure 6 | 2m (6.56 ft) cable |
| STE080PA-L | \$56.00 | Ø 1.5mm plunger | Threaded | M8×1.25 | 0.7mm | N.O. | 2N | Figure 7 | 2m (6.56 ft) cable |
| STE100PA-L | \$56.00 | Ø 1.5mm plunger | Threaded | M10×1.5 | 0.7mm | N.O. | 2N | Figure 8 | 2m (6.56 ft) cable |

* Ø = diameter

STP Series (Stopper With Protective Cover)

STS Series (Straight Stopper Bolt)

STE Series (Hexagonal Stopper Bolt)



STP100UA-L



STS060PA-L



STE060PA-L



STP100DA-L



STS080PA-L



STE080PA-L



STS100PA-L



STE100PA-L

Precision Limit Switches Dimensions

Stopper Bolt: STP / STS / STE Series

Dimensions

mm [inches]

Figure 1
STP100UA-L

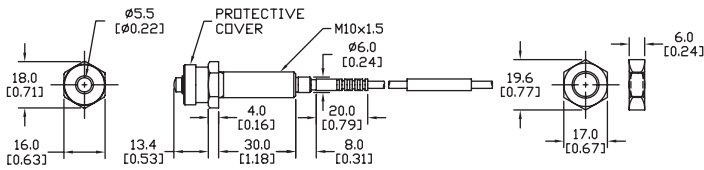


Figure 2
STP100DA-L

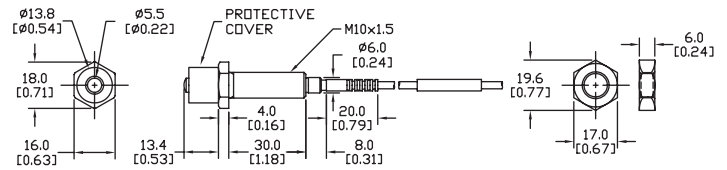
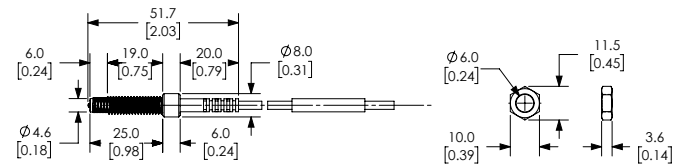


Figure 3
STS060PA-L



MATERIAL: SUS304

Figure 4
STS080PA-L

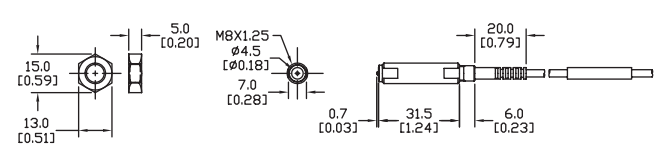


Figure 5
STS100PA-L

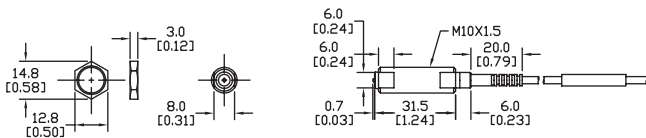
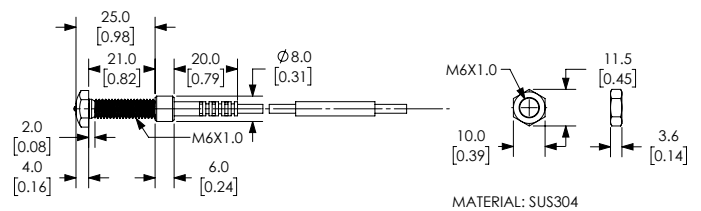


Figure 6
STE060PA-L



MATERIAL: SUS304

Figure 7
STE080PA-L

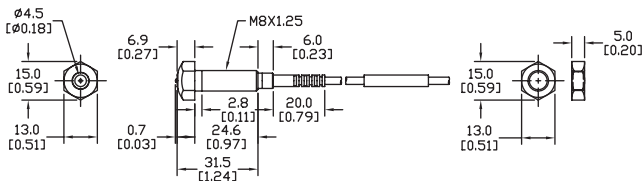
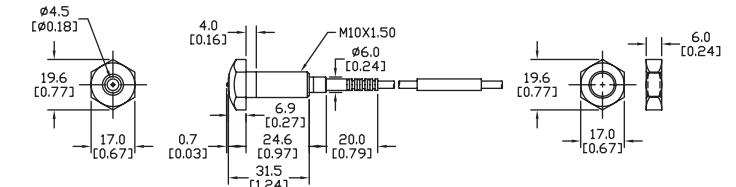


Figure 8
STE100PA-L



See our website, www.AutomationDirect.com, for complete Engineering drawings.

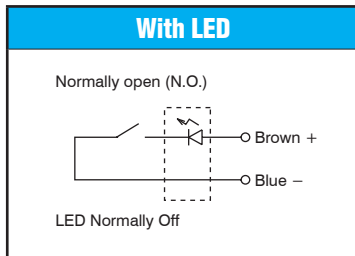
Precision Limit Switches

| Stopper Bolt Precision Limit Switches Specifications | | | |
|---|---|--------|-----|
| | STP | STS | STE |
| Environmental | | | |
| Degree of Protection | IP67** | IP65** | |
| Temperature Range | Operating: 0–80°C (32–392°F) (Ice-free) | | |
| Mechanical Ratings | | | |
| Enclosure Material | Stainless steel | | |
| Torque (for nuts on threaded barrels, set screws on smooth barrels) | See Torque Limit Figure | | |
| Oscillation | 10–55Hz total amplitude 1.5 for X, Y, Z each direction | | |
| Impact | 300 m/s ² for X, Y, Z each direction | | |
| Repeat Accuracy | Both On-Off, Off-On/ 0.01 (range) (At operating speed 50-200mm/min) *2 | | |
| Recommended Minimum Operating Speed | 10 mm (0.394 in)/minute | | |
| Withstand Load | 5000N | | |
| Electrical Ratings | | | |
| Contact Life | 10 million (No bungle caused by vibration and use under contact rating) | | |
| Impact resistance | 0.4J | | |
| Contact Voltage | 5–24VDC | | |
| Steady Current Rating | 10mA or less | | |
| Max In-rush Current Rating | 20mA | | |
| Connection Type | Standard length 2m (6.56 ft) oil resistant 2.8 / 2 cores, 26AWG Tensile strength 30N, minimum bending R7 | | |
| Indicating | -L: LED indicator (mounted in cable 120mm from the switch) | | |

* At operating speed 50-200 mm/minute. Operating speed slower than 10 mm/min is not recommended.

** At normal temperature (0–80°C [32–176°F]).

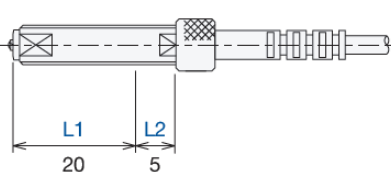
Circuit Diagram



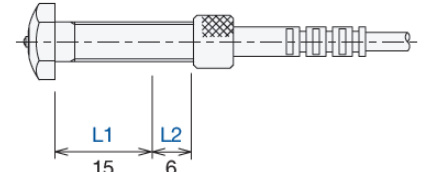
Torque Limits

| Applicable models | Tightening torque |
|-------------------|--------------------------|
| STS060PA | L1: 4 N•m (2.95 lb•ft) |
| STE060PA | L2: 2.5 N•m (1.84 lb•ft) |
| STS080PA | 10 N•m (7.38 lb•ft) |
| STE080PA | 10 N•m (7.38 lb•ft) |
| STS100PA | 25 N•m (18.44 lb•ft) |
| STE100PA | 25 N•m (18.44 lb•ft) |
| STP100UA | 25 N•m (18.44 lb•ft) |
| STP100DA | 25 N•m (18.44 lb•ft) |

STS060PA



STE060PA

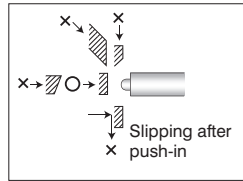


Precision Limit Switches

Low Contact Force Limit Switches: CSFN / CS / CSJ

- 0.1N and 0.5N contact force
- 5 micron (μm) and 10 micron (μm) repeat accuracy
- Stainless steel housing
- Metal bearing
- Straight-touch and straight needle touch available

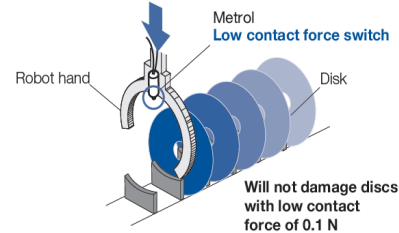
Low Contact Force Straight Touch



O indicates correct target approach and orientation.
 X indicates approach and orientation that should be avoided.

CSFN105A-H6X must be mounted downward

Detects presence of HDD discs



| Low Contact Force Limit Switches Selection Chart | | | | | | | | | |
|---|---------|--|-------------|-------------------------|-------------------|------------------|---------------|-------------------|--------------------|
| Part Number | Price | Actuator/ Head Type* | Barrel Type | Barrel Diameter/Thread* | Stroke | Switching Output | Contact Force | Sensor Dimensions | Connection Type |
| Low Contact Force, Metal Bearing, Downward Mounting Only | | | | | | | | | |
| CSFN105A-H6X | \$39.00 | \emptyset 2mm (0.079 in) plunger SR 1.5 mm (0.059 in) | Threaded | M10x0.5 | 2mm (0.079 in) | N.O. NPN | 0.1 N | Figure 1 | 3m (9.84 ft) cable |
| Low Contact Force, Straight Touch, Metal Bearing | | | | | | | | | |
| CS067A-LG | \$51.00 | \emptyset 2mm (0.079 in) plunger SR 1.5 mm (0.059 in) | Threaded | M6x0.75 | 2.8 mm (0.110 in) | N.O. | 0.5 N | Figure 2 | 3m (9.84 ft) cable |
| Low Contact Force, Straight Touch, Needle Contact | | | | | | | | | |
| CSJ055A-CG | \$44.00 | \emptyset 2mm (0.079 in) plunger SR 1.5 mm (0.059 in) | Threaded | M5x0.5 | 2.8 mm (0.110 in) | N.O. | 0.5 N | Figure 3 | 3m (9.84 ft) cable |

\emptyset = diameter, SR = surface radius

* Must be mounted in a downward direction



CSFN105A-H6X



CS067A-LG



CSJ055A-CG

Precision Limit Switches

Low Contact Force Limit Switches: CSFN / CS / CSJ

Dimensions

mm [inches]

Figure 1
CSFN105A-H6X

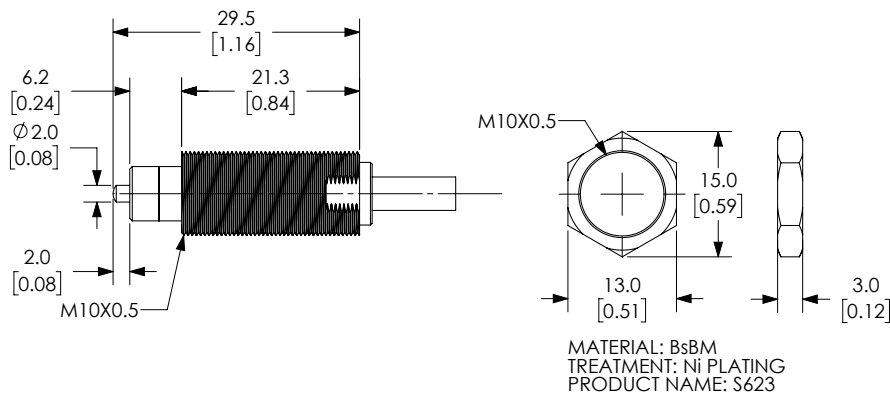


Figure 2
CS067A-LG

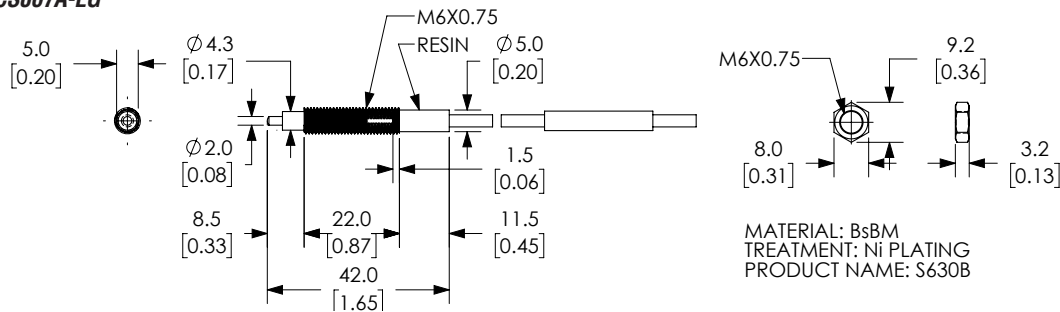
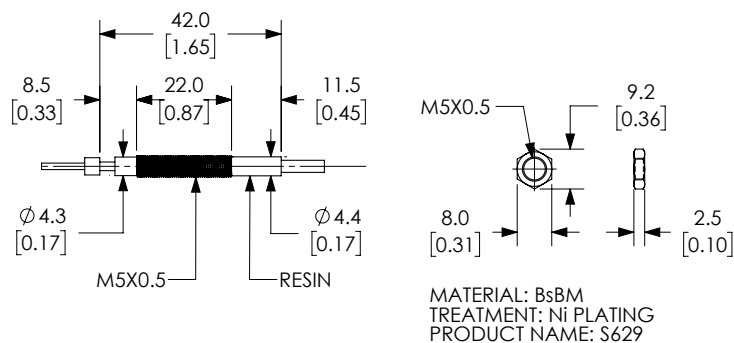


Figure 3
CSJ055A-CG



Precision Limit Switches

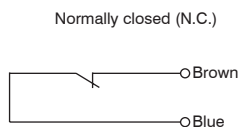
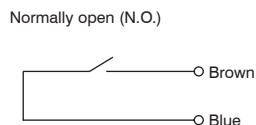
Low Contact Force Limit Switches: CSFN / CS / CSJ

| Low Contact Force Limit Switches Specifications | | | |
|--|---|---|---|
| | CSFN Metal Bearing | CS Custom Metal Bearing | CSJ Custom Needle Contact |
| Environmental | | | |
| Degree of Protection | IP40 | IP65 | |
| Temperature Range | Operating: 0–60°C (32–140°F) (Ice-free) | | Operating: 0–80°C (32–176°F) (Ice-free) |
| Mechanical Ratings | | | |
| Enclosure Material | Stainless Steel (mounting nuts are Ni-plated brass) | | |
| Pretravel | 0.4 mm (0.016 in) | 0.3 mm (0.012 in) | |
| Torque (for nuts on threaded barrels, set screws on smooth barrels) | 4 N•m (2.95 lb•ft) | 2 N•m (1.48 lb•ft) | N/A |
| Oscillation | 10–55Hz total amplitude 1.5 for X, Y, Z each direction | | |
| Impact | 300 m/s ² for X, Y, Z each direction | | |
| Repeat Accuracy | 0.01 mm (10 micron [μm]) | 0.005 mm (5 micron [μm]) | |
| Recommended Minimum Operating Speed | 10 mm (0.394 in)/minute | | |
| Electrical Ratings | | | |
| Contact Life | 10 million operations | | |
| Contact Voltage | 12–24VDC | 5–24VDC | |
| Steady Current Rating | 10mA or less | | |
| Max In-rush Current Rating | 10mA (limit current to protect LED indicator) | | |
| Connection Type | Cable: 3m PVC (polyvinyl chloride) oil resistant Ø4/3 cores, 30AWG Tensile strength 30N, minimum bending R7 | Cable: 3m PVC (polyvinyl chloride) oil resistant Ø2.8/2 cores, 26AWG Tensile strength 30N, minimum bending R7 | |
| Indicating | -L: LED indicator (mounted in cable 120mm from the switch) | | |

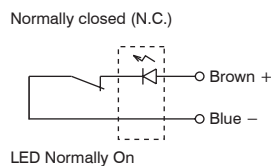
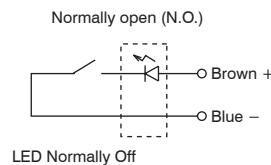
* At operating speed 50-200 mm/minute. Operating speed slower than 10 mm (0.393 in)/min is not recommended.

Circuit Diagrams

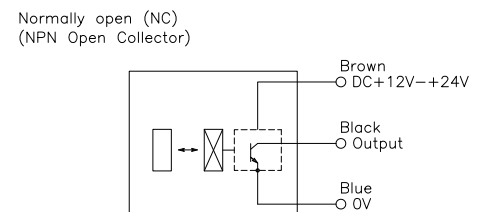
Without LED



With LED



CSFN105A-H6X

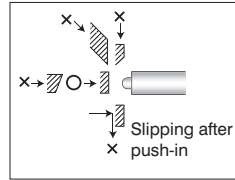


Precision Limit Switches

90-Degree Straight Touch Limit Switches

- Slim design
- 90-degree cable orientation
- Long-stroke models available
- 5 micron (μm) repeat accuracy
- Stainless steel housing
- Metal bearing
- Straight-touch and straight needle touch available

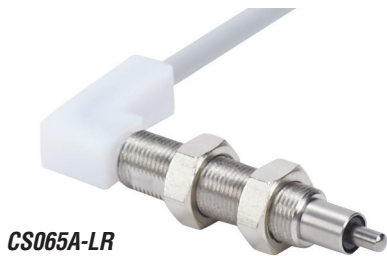
90-Degree Straight Touch



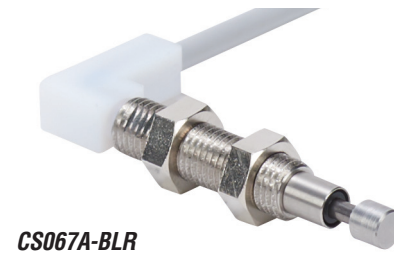
O indicates correct target approach and orientation.
 X indicates approach and orientation that should be avoided.

| 90-Degree Straight Touch Limit Switches Selection Chart | | | | | | | | | |
|---|---------|---|-------------|-------------------------|-------------------|------------------|---------------|-------------------|--------------------|
| Part Number | Price | Actuator/ Head Type* | Barrel Type | Barrel Diameter/Thread* | Stroke | Switching Output | Contact Force | Sensor Dimensions | Connection Type |
| 90-Degree Straight Touch | | | | | | | | | |
| CS065A-LR | \$57.00 | Ø 2mm (0.079 in) plunger SR 1.5 mm (0.059 in) | Threaded | M6x0.5 | 2.8 mm (0.110 in) | N.O. | 1N | Figure 1 | 3m (9.84 ft) cable |
| CS067A-BLR | \$57.00 | Ø 2mm (0.079 in) plunger Ø 4mm (0.016 in) flat | Threaded | M6x0.75 | 2.8 mm (0.110 in) | N.O. | 1N | Figure 2 | 3m (9.84 ft) cable |
| CS067A-LR | \$55.00 | Ø 2mm (0.079 in) plunger SR 1.5 mm (0.059 in) | Threaded | M6x0.75 | 2.8 mm (0.110 in) | N.O. | 1N | Figure 3 | 3m (9.84 ft) cable |
| CS067B-LR | \$55.00 | Ø 2mm (0.079 in) plunger SR 1.5 mm (0.059 in) | Threaded | M6x0.75 | 2.8 mm (0.110 in) | N.C. | 1N | Figure 4 | 3m (9.84 ft) cable |
| CS087A-LR | \$55.00 | Ø 3.5 mm (0.138 in) plunger SR 3 mm (0.118 in) | Threaded | M8x0.5 | 2.8 mm (0.110 in) | N.O. | 1N | Figure 5 | 3m (9.84 ft) cable |
| CSJ055A-LR | \$50.00 | Ø 2mm (0.079 in) plunger SR 1.5 mm (0.059 in) | Threaded | M5x0.5 | 2.8 mm (0.110 in) | N.O. | 1N | Figure 6 | 3m (9.84 ft) cable |
| CSJS50A-LR | \$50.00 | Ø 2mm (0.079 in) plunger SR 1.5 mm (0.059 in) | Smooth | Ø 5 | 2.8 mm (0.110 in) | N.O. | 1N | Figure 7 | 3m (9.84 ft) cable |
| CSK087A-LR | \$54.00 | Ø 3.5 mm (0.138 in) plunger SR 3 mm (0.118 in) | Threaded | M8x0.75 | 5 mm (0.197 in) | N.O. | 1N | Figure 8 | 3m (9.84 ft) cable |
| CSK087B-LR | \$54.00 | Ø 3.5 mm (0.138 in) plunger SR 3 mm (0.118 in) | Threaded | M8x0.75 | 5 mm (0.197 in) | N.C. | 1N | Figure 9 | 3m (9.84 ft) cable |

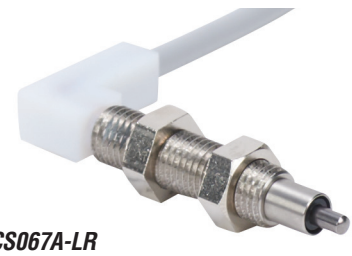
* Ø = diameter, SR = surface radius



CS065A-LR



CS067A-BLR



CS067A-LR



CS067B-LR



CS087A-LR



CSJ055A-LR



CSJS50A-LR



CSK087A-LR



CSK087B-LR

Precision Limit Switches

90-Degree Straight Touch Limit Switches

Dimensions

mm [inches]

Figure 1
CS065A-LR

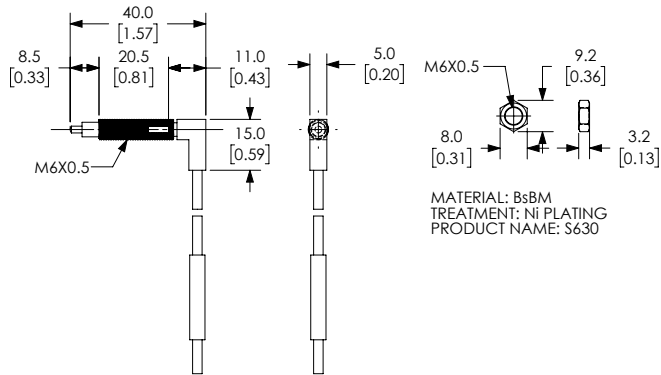


Figure 2
CS067A-BLR

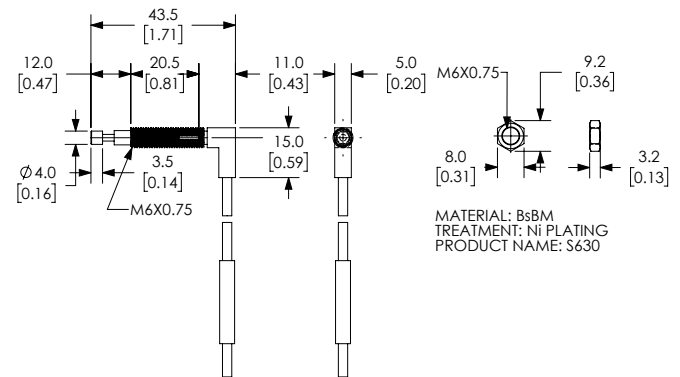


Figure 3
CS067A-LR

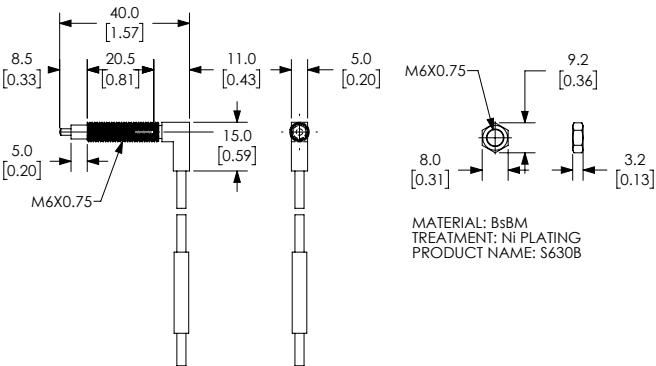


Figure 4
CS067B-LR

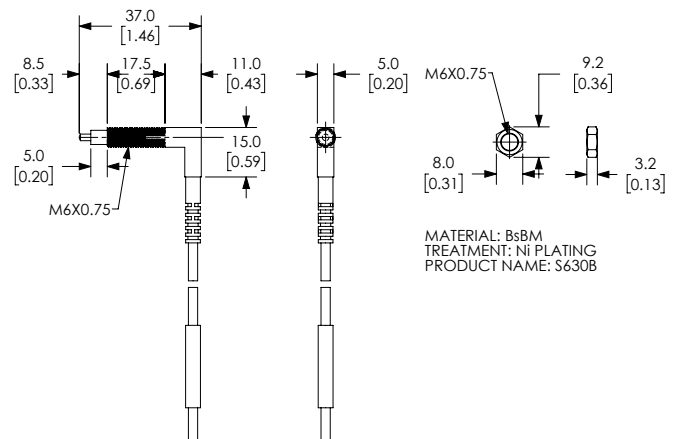
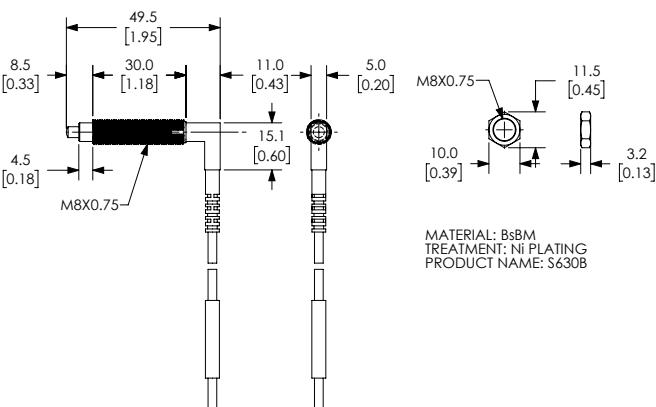


Figure 5
CS087A-LR



Dimensions continued on next page

Precision Limit Switches

90-Degree Straight Touch Limit Switches

Dimensions (continued)

mm [inches]

Figure 6
CSJ055A-LR

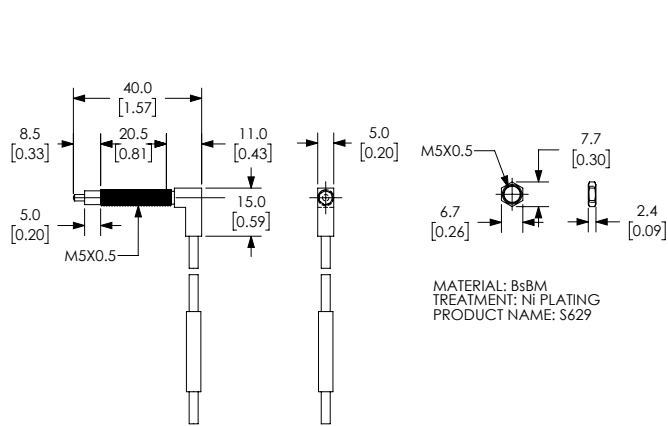


Figure 7
CSJS50A-LR

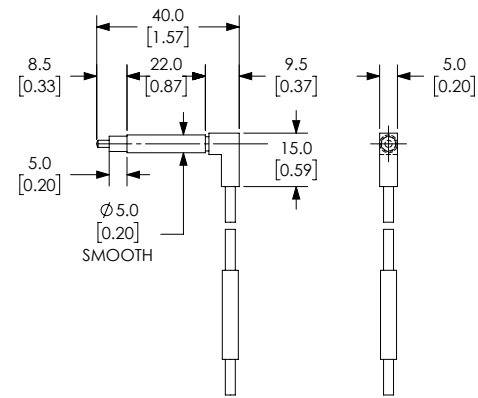


Figure 8
CSK087A-LR

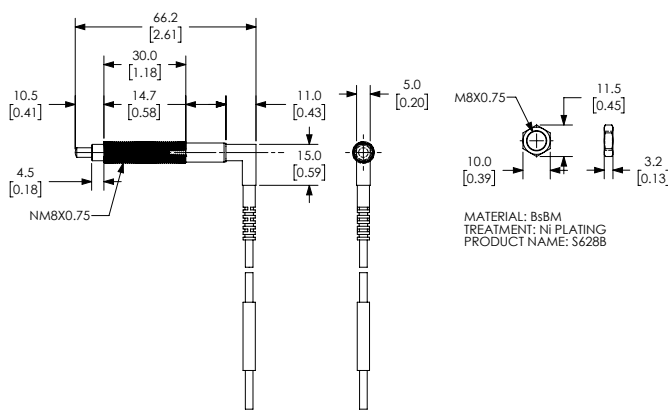
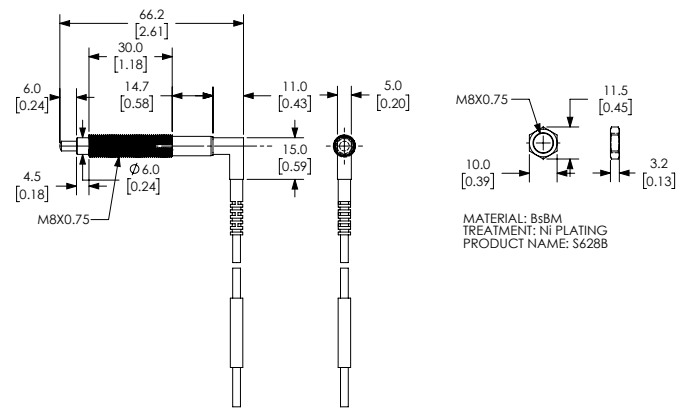


Figure 9
CSK087B-LR



Precision Limit Switches

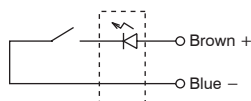
90-Degree Straight Touch Limit Switches

| 90-Degree Straight Touch Limit Switches Specifications | | | |
|--|--|--------------------|--------------------|
| | CS | CSJ | CSK |
| Environmental | | | |
| Degree of Protection | IP65 | | |
| Temperature Range | Operating: 0–80°C (32–176°F) (Ice-free) | | |
| Mechanical Ratings | | | |
| Enclosure Material | Stainless Steel | | |
| Pretravel | 0.3 mm | | |
| Torque (for nuts on threaded barrels, set screws on smooth barrels) | 4 N•m (2.95 lb•ft) | 2 N•m (1.48 lb•ft) | 7 N•m (5.16 lb•ft) |
| Oscillation | 10–55Hz total amplitude 1.5 for X, Y, Z each direction | | |
| Impact | 300 m/s ² for X, Y, Z each direction | | |
| Repeat Accuracy | 5 micron (µm) | | |
| Recommended Minimum Operating Speed | 10 mm/minute | | |
| Electrical Ratings | | | |
| Contact Life | 10 million operations | | |
| Contact Voltage | 5–24VDC | | |
| Steady Current Rating | 10mA or less | | |
| Max In-rush Current Rating | 10mA (limit current to protect LED indicator) | | |
| Connection Type | Cable: 3m (9.84 ft), oil resistant, Ø2.8/2 cores, tensile strength 30N (6.74 lbf), minimum bending R7, 2-26AWG | | |
| Indicating | -L: LED indicator (mounted in cable 120mm from the switch) | | |

* At operating speed 50-200 mm/minute. Operating speed slower than 10 mm/min is not recommended.

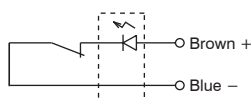
Circuit Diagrams

Normally open (N.O.)



LED Normally Off

Normally closed (N.C.)



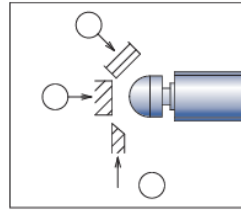
LED Normally On

Precision Limit Switches

Sliding Angled Offset Touch Limit Switches

- Metal and plastic hemisphere actuators
- 5 micron (μm) repeat accuracy
- Stainless steel housing

Sliding Angled Offset Touch



- indicates correct target approach and orientation.
- ✕ indicates approach and orientation that should be avoided.

| Sliding Angled Offset Touch Limit Switches Selection Chart | | | | | | | | | |
|--|----------|--------------------------|-------------|-------------------------|-------------------|------------------|---------------|-------------------|--------------------|
| Part Number | Price | Actuator/ Head Type* | Barrel Type | Barrel Diameter/Thread* | Stroke | Switching Output | Contact Force | Sensor Dimensions | Connection Type |
| Sliding Angled Offset Touch | | | | | | | | | |
| CSHP085A-L | \$134.00 | Ø 4.7 mm SR 3mm | Threaded | M8x0.5 | 2.8 mm (0.110 in) | N.O. | 1N | Figure 1 | 2m (6.56 ft) cable |
| CSHP085B-L | \$134.00 | Ø 4.7 mm SR 3mm | Threaded | M8x0.5 | 2.8 mm (0.110 in) | N.C. | 1N | Figure 1 | 2m (6.56 ft) cable |
| CSH121A-AL | \$65.00 | Ø 10 hemisphere | Threaded | M12x1 | 2.8 mm (0.110 in) | N.O. | 1.5 N | Figure 2 | 2m (6.56 ft) cable |
| CSH121B-AL | \$68.00 | Ø 10 hemisphere | Threaded | M12x1 | 2.8 mm (0.110 in) | N.C. | 1.5 N | Figure 2 | 2m (6.56 ft) cable |
| CSH121A-APL | \$76.00 | Ø 10 hemisphere, plastic | Threaded | M12x1 | 2.8 mm (0.110 in) | N.O. | 1.5 N | Figure 2 | 2m (6.56 ft) cable |
| CSH121B-APL | \$76.00 | Ø 10 hemisphere, plastic | Threaded | M12x1 | 2.8 mm (0.110 in) | N.C. | 1.5 N | Figure 2 | 2m (6.56 ft) cable |

* Ø = diameter, SR = surface radius



CSHP085A-L
CSHP085B-L



CSH121A-AL



CSH121B-AL



CSH121A-APL



CSH121B-APL

Precision Limit Switches

Sliding Angled Offset Touch Limit Switches

Dimensions

mm [inches]

Figure 1
CSHP085A-L
CSHP085B-L

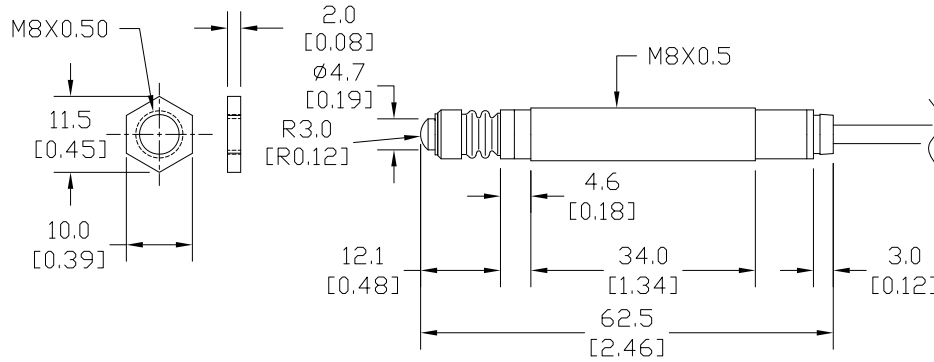
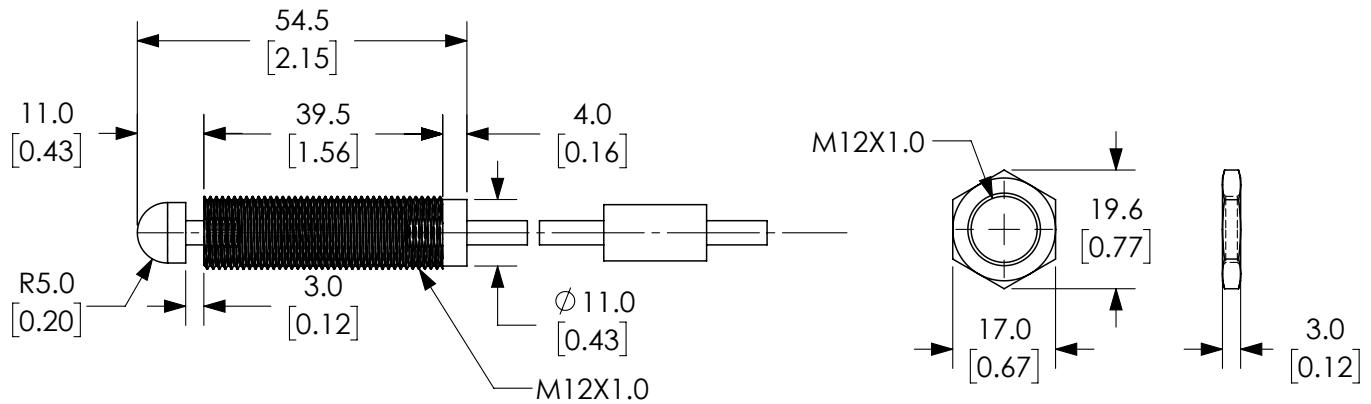


Figure 2
CSH121A-AL
CSH121B-AL
CSH121A-APL
CSH121B-APL



MATERIAL: BsBM
TREATMENT: Ni PLATING
PRODUCT NAME: S645

Precision Limit Switches

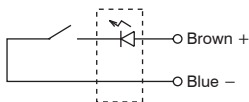
Sliding Angled Offset Touch Limit Switches

| Sliding Angled Offset Touch Limit Switches Specifications | | |
|---|---|---------------------|
| | CSHP | CSH |
| Environmental | | |
| Degree of Protection | IP67 | IP65 |
| Temperature Range | Operating: 0–80°C (32–176°F) (Ice-free) | |
| Mechanical Ratings | | |
| Enclosure Material | Stainless Steel | |
| Pretravel | 0.3 mm | |
| Torque (for nuts on threaded barrels, set screws on smooth barrels) | 4 N•m (2.95 lb•ft) | 12 N•m (8.85 lb•ft) |
| Oscillation | 10–55Hz total amplitude 1.5 for X, Y, Z each direction | |
| Impact | 300 m/s ² for X, Y, Z each direction | |
| Repeat Accuracy | 0.005 mm (5 micron [µm]) | |
| Recommended Minimum Operating Speed | 10 mm (0.394 in)/minute | |
| Electrical Ratings | | |
| Contact Life | 10 million operations | |
| Contact Voltage | 5–24VDC | |
| Steady Current Rating | 10mA or less | |
| Max In-rush Current Rating | 10mA (limit current to protect LED indicator) | |
| Connection Type | Cable: 3m, oil resistant Ø2.8/2 cores, Tensile strength 30N (6.74 lbf), minimum bending R7, 2-26AWG | |
| Indicating | -L: LED indicator (mounted in cable 120mm from the switch) | |

* At operating speed 50-200 mm/minute. Operating speed slower than 10 mm/min is not recommended.

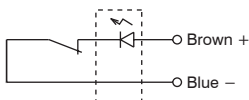
Circuit Diagrams

Normally open (N.O.)



LED Normally Off

Normally closed (N.C.)



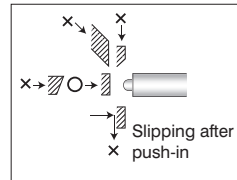
LED Normally On

Precision Limit Switches

Precision Mini Straight Touch Limit Switches

- Mini size suitable for machines required to be small and for narrow installation space.
- Stroke length (1.5 mm)
- 3 micron (μm) repeat accuracy
- Stainless steel housing
- Metal bearing

Precision Mini Touch



O indicates correct target approach and orientation.
 X indicates approach and orientation that should be avoided.

| Precision Mini Touch Limit Switches Selection Chart | | | | | | | | | |
|---|---------|---------------------------------|-------------|-------------------------|--------|------------------|---------------|-------------------|---------------------------|
| Part Number | Price | Actuator/ Head Type* | Barrel Type | Barrel Diameter/Thread* | Stroke | Switching Output | Contact Force | Sensor Dimensions | Connection Type |
| Precision Mini | | | | | | | | | |
| CSM105WA | \$48.50 | Ø 3.5mm plunger | Threaded | M10×0.5 | 1.5 mm | N.O. | 1N | Figure 1 | 0.5 m (1.64 ft) core wire |
| CSMP105WA | \$51.00 | 2mm plunger with boot/ SR 2.5mm | Threaded | M10×0.5 | 1.5 mm | N.O. | 1N | Figure 2 | 0.5 m (1.64 ft) core wire |
| CSM105CA-L | \$52.00 | Ø 3.5mm plunger | Threaded | M10×0.5 | 1.5 mm | N.O. | 1N | Figure 3 | 2m (6.56 ft) cable |
| CSMP105CA-L | \$56.00 | 2mm plunger with boot | Threaded | M10×0.5 | 1.5 mm | N.O. | 1N | Figure 4 | 2m (6.56 ft) cable |

* Ø = diameter, SR = surface radius

-L: LED indicator (mounted in cable 120mm from the switch)



Precision Limit Switches

Precision Mini Touch Limit Switches

Dimensions

mm [inches]

Figure 1
CSM105WA

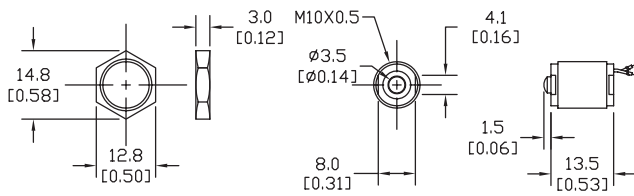


Figure 2
CSMP105WA

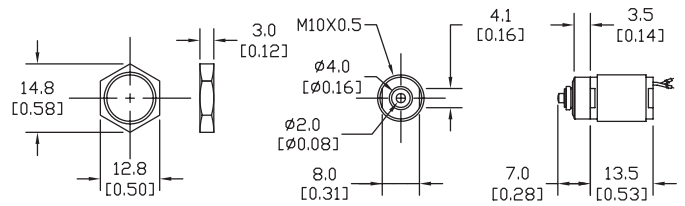


Figure 3
CSM105CA-L

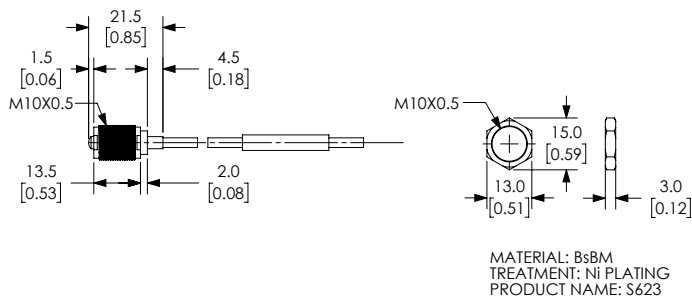
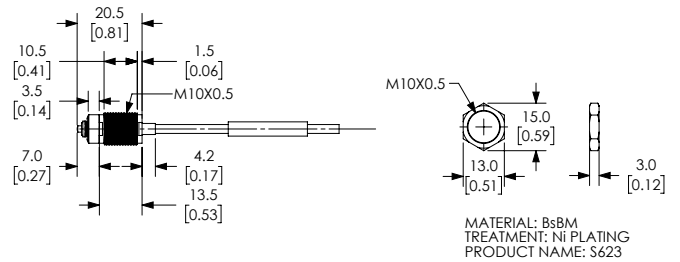


Figure 4
CSMP105CA-L



Precision Limit Switches

Precision Mini Touch Limit Switches

| Precision Mini Touch Limit Switches Specifications | | |
|---|---|----------------|
| | Precision Angled | Precision Mini |
| | CSM | CSMP |
| Environmental | | |
| Degree of Protection | IP65 | IP67 |
| Temperature Range | Operating: 0–80°C (32–176°F) (Ice-free) | |
| Mechanical Ratings | | |
| Enclosure Material | 303 Stainless Steel | |
| Pretravel | 0.3 mm | |
| Torque (for nuts on threaded barrels, set screws on smooth barrels) | 8 N•m (5.901 lb•ft) | |
| Oscillation | 10–55Hz total amplitude 1.5 for X, Y, Z each direction | |
| Impact | 300 m/s ² for X, Y, Z each direction | |
| Repeat Accuracy | Both On–Off, Off–On: 0.003 mm* | |
| Recommended Minimum Operating Speed | 10 mm/minute | |
| Electrical Ratings | | |
| Contact Life | 10 million operations | |
| Contact Voltage | 5–24VDC | |
| Steady Current Rating | 10mA or less | |
| Max In-rush Current Rating | 10mA (limit current to protect LED indicator) | |
| Connection Type | Core wire cable, 0.5 m (x2), oil resistant, Ø 0.6, tensile strength 15N, Cable: 2m, oil resistant Ø2.8/2 cores, tensile strength 30N (6.74 lbf), 2-26AWG | |
| Indicating | -L: LED indicator (mounted in cable 120mm from the switch) | |

* At operating speed 50-200 mm/minute. Operating speed slower than 10 mm/min is not recommended.

Circuit Diagrams

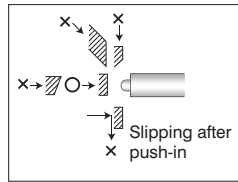
| Without LED | With LED |
|-------------------------------|--|
| <p>Normally open (N.O.)</p> | <p>Normally open (N.O.)</p> <p>LED Normally Off</p> |
| <p>Normally closed (N.C.)</p> | <p>Normally closed (N.C.)</p> <p>LED Normally On</p> |

Metrol Precision Limit Switches

High-Vacuum Resistance Switches

- Can be used in 10⁻⁵ PA high-vacuum environments
- Switch body made using low outgassing material and adhesive

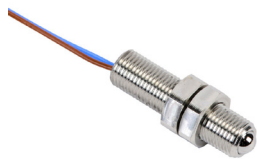
High Vacuum Resistance



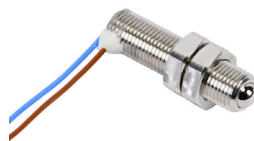
O indicates correct target approach and orientation.
 X indicates approach and orientation that should be avoided.

| High-Vacuum Resistance Switches Selection Chart | | | | | | | | | | |
|---|----------|--|-------------|------------------------|-------------------|-------------|-----------------------|---------------|---|---------------------|
| Part Number | Price | Actuator/Head Type* | Barrel Type | Barrel Diameter/Thread | Stroke | Output Mode | Repeatability | Contact Force | Connection Type | Dimensional Drawing |
| High-Vacuum Resistance Switches | | | | | | | | | | |
| GN-BP5MA | \$270.00 | Angled touch | Threaded | M5x0.5 | 1.0 mm [0.039 in] | N.O. | 0.01 mm [0.00039 in] | 1N | Cable direction: straight Polytetrafluoroethylene (PTFE) 0.5 m [1.6 ft] core wire, AWG 30 | PDF |
| GN-BP5MA-R | \$275.00 | Angled touch | Threaded | M5x0.5 | 1.0 mm [0.039 in] | N.O. | 0.01 mm [0.00039 in] | 1N | Cable direction: 90° Polytetrafluoroethylene (PTFE) 0.5 m [1.6 ft] core wire, AWG 30 | PDF |
| GN-PT5M3A | \$197.00 | Straight touch Ø 1.5 mm [0.059 in] plunger SR 2mm [0.079 in] | Threaded | M5x0.5 | 1.5 mm [0.059 in] | N.O. | 0.003 mm [0.00012 in] | 0.5 N | Cable direction: straight Polytetrafluoroethylene (PTFE) 0.5 m [1.6 ft] core wire, AWG 30 | PDF |
| GN-PT5M3B | \$197.00 | Straight touch Ø 1.5 mm [0.059 in] plunger SR 2mm [0.079 in] | Threaded | M5x0.5 | 1.5 mm [0.059 in] | N.C. | 0.003 mm [0.00012 in] | 0.5 N | Cable direction: straight Polytetrafluoroethylene (PTFE) 0.5 m [1.6 ft] core wire, AWG 30 | PDF |
| GN-BP161B | \$960.00 | Angled touch | Threaded | M16x1 | 2.9 mm [0.114 in] | N.C. | 0.01 mm [0.00039 in] | 1.5 N | Cable direction: straight Polytetrafluoroethylene (PTFE) 0.5 m [1.6 ft] core wire, AWG 30 | PDF |
| GN-CSK141B | \$960.00 | Straight touch | Threaded | M14x1 | 5mm [0.197 mm] | N.C. | 0.01 mm [0.00039 in] | 0.8 N | Cable direction: straight Polytetrafluoroethylene (PTFE) 0.5 m [1.6 ft] core wire, AWG 30 | PDF |

* Ø = diameter, SR = surface radius



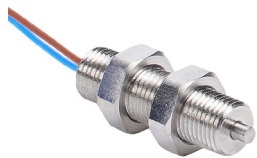
GN-BP5MA



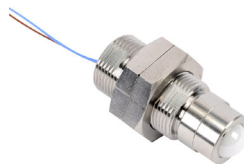
GN-BP5MA-R



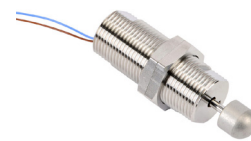
GN-PT5M3A



GN-PT5M3B



GN-BP161B



GN-CSK141B

Precision Limit Switches

High-Vacuum Resistance Switches

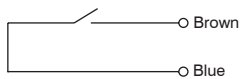
| High-Vacuum Resistance Switches Specifications | |
|--|--|
| | GN Series |
| Environmental | |
| Compatible Vacuum | 10 ⁻⁵ PA |
| Degree of Protection | IP40 |
| Temperature Range | 120°C [248°F] (allowable baking temperature) |
| Mechanical Ratings | |
| Enclosure Material | 304 Stainless Steel |
| Pretravel | 0mm [0in]: (GN-PT5M3B, GN-CSK141B) 0.2 mm [0.0079 in]: (GN-BP161B) 0.3 mm [0.0118 in]: (GN-BP5MA, GN-BP5MA-R, GN-PT5M3A) |
| Torque (for nuts on threaded barrels, set screws on smooth barrels) | 1 N•m [0.73 lb•ft] |
| Oscillation | 10–55Hz total amplitude 1.5 for X, Y, Z each direction |
| Impact | 300 m/s ² for X, Y, Z each direction |
| Electrical Ratings | |
| Contact Life | 3 million operations |
| Repeat Accuracy** | Both On-Off, Off-On: See Selection Table |
| Recommended Minimum Operating Speed | 10mm [0.39 in] / minute |
| Contact Voltage | 5-24 VDC |
| Steady Current Rating | 10mA or less |
| Max In-rush Current Rating | 20mA |
| Connection Type | 0.5 m [19.69 in] Polytetrafluoroethylene (PTFE) core wire, 2x30AWG |
| Indicating | N/A |

* Adjust the installed location of the switch by the signal switching point.

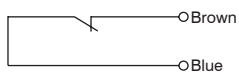
** At operating speed 50-200 mm/minute. Operating speed slower than 10 mm/min is not recommended.

Circuit Diagrams

Normally open (N.O.)



Normally closed (N.C.)

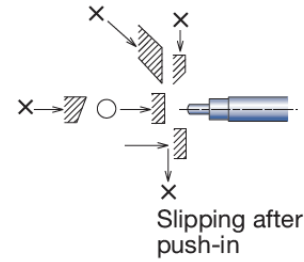
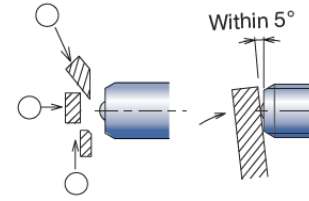


Precision Limit Switches

High Temperature: HT Series

- Plunger and ball plunger models
- Constructed using heat resistant parts and adhesives
- Heat resistant cable
- Operating temperature upper limit of 200°C [392°F]

High Temperature HT Series



○ indicates correct target approach and orientation.
 × indicates approach and orientation that should be avoided.

| High Temperature Precision Limit Switches Selection Chart | | | | | | | | | |
|---|----------|--|-------------|------------------------|-------------------|------------------|-------------------|--------------------|---------------------|
| Part Number | Price | Actuator/Head Type* | Barrel Type | Barrel Diameter/Thread | Stroke | Switching Output | Contact Force | Connection Type | Dimensional Drawing |
| Straight/Precision Touch | | | | | | | | | |
| CS067A-HT2 | \$210.00 | Ø 2mm plunger, SR 1.5 mm [0.059 in] | Threaded | M6×0.75 | 2.8 mm (0.110 in) | N.O. | 1N | 2m [6.56 ft] cable | PDF |
| HT-CS067A | \$198.00 | Ø 2mm plunger, SR 1.5 mm [0.059 in] | Threaded | M6×0.75 | 2.8 mm (0.110 in) | N.O. | 1N | 2m [6.56 ft] cable | PDF |
| Indexing/Angled/Sliding Touch/Ball Plunger | | | | | | | | | |
| BP060A-HT2 | \$194.00 | Ø 3mm [0.118 in] ball | Threaded | M6×1.0 | 0.8 mm (0.031 in) | N.O. | Min 6N Max 13N | 2m [6.56 ft] cable | PDF |
| HT-BP060A | \$181.00 | Ø 3mm [0.118 in] ball | Threaded | M6×1.0 | 0.8 mm (0.031 in) | N.O. | Min 6N Max 13N | 2m [6.56 ft] cable | PDF |
| Heat Resistant Stopper Bolt | | | | | | | | | |
| STS060A-HT2 | \$165.00 | 1.5 mm [0.059 in] plunger, 3.4 mm [0.139 in] flat | Threaded | M6×1.0 | 0.7 mm (0.028 in) | N.O. | 1N | 2m [6.56 ft] cable | PDF |
| STM82A-HT2 | \$162.00 | Ø 3 mm [0.118 in] plunger with boot | Threaded | M10×0.75 | 0.3 mm (0.012 in) | N.O. | 1N | 2m [6.56 ft] cable | PDF |

* Ø = diameter, SR = surface radius



Precision Limit Switches

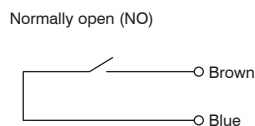
High Temperature: HT Series

| | CS067A-HT2 | HT-CS067A | BP060A-HT2 | HT-BP060A | STS060A-HT2 | STM82A-HT2 |
|---|---|---|---|---|---|---|
| Environmental | | | | | | |
| Degree of Protection | IP65** | IP65** | IP40** | IP40** | IP40** | IP65** |
| Temperature Range | Operating: 0–200°C [32–392°F] (Ice-free) | | | | | |
| Mechanical Ratings | | | | | | |
| Enclosure Material | Stainless steel | | | | | |
| Pretravel | 0.3 mm (0.012 in) | | 0.5 mm [0.020 in] from end face | 0.3 mm [0.012 in] from stopping face | Middle of stroke | |
| Torque (for nuts on threaded barrels, set screws on smooth barrels) | 4 N•m | 4 N•m | See BP060A-HT2 Torque Limit Figure | See BP060A-HT2 Torque Limit Figure | – | – |
| | | | L1: 2.5 N•m (1.844 lb•ft) L2: 5 N•m (3.688 lb•ft) L3: 5 N•m (3.688 lb•ft) | L1: 2.5 N•m (1.844 lb•ft) L2: 5 N•m (3.688 lb•ft) L3: 5 N•m (3.688 lb•ft) | L1: 5 N•m (3.688 lb•ft) L2: 5 N•m (3.688 lb•ft) | 10 N•m (7.376 lb•ft) |
| Oscillation | 10–55 Hz total amplitude 1.5 for X, Y, Z each direction | | | | | |
| Impact | 300 m/s ² for X, Y, Z each direction | | | | | |
| Electrical Ratings | | | | | | |
| Contact Life | 3 million operations | | | | | |
| Repeat Accuracy | Both On–Off, Off–On: 0.01 mm [0.00039 in] * ** | | | | | |
| Recommended Minimum Operating Speed | 10 mm [0.394 in]/minute | | | | | |
| Contact Voltage | 5-24 VDC | | | | | |
| Steady Current Rating | 10mA or less | | | | | |
| Max In-rush Current Rating | 20mA | | | | | |
| Connection Type | Cable: 2m [6.56 ft] heat-resistant Ø 2.8 2 cores, 26AWG | Cable: 2m [6.56 ft] heat-resistant Ø 2.8 2 cores, 24AWG | Cable: 2m [6.56 ft] heat-resistant Ø 2.8 2 cores, 26AWG | Cable: 2m [6.56 ft] heat-resistant Ø 2.8 2 cores, 24AWG | Cable: 2m [6.56 ft] heat-resistant Ø 2.8 2 cores, 26AWG | Cable: 2m [6.56 ft] heat-resistant Ø 2.8 2 cores, 26AWG |
| Indicating | N/A | | | | | |

* At operating speed 50-200 mm [1.97-7.87 in]/minute. Operating speed slower than 10mm [0.39 in]/min is not recommended.

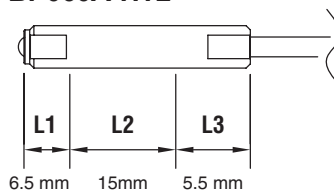
** At normal temperature (0-80°C [32-176°F]).

Circuit Diagrams



Torque Limits

BP060A-HT2

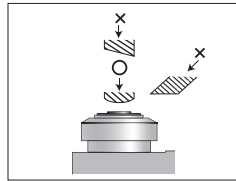


Precision Limit Switches

High Precision Tool Setter Switches

- Tool setter for blade positioning, wear detection, breakage, etc.
- 0.5 micron (μm) repeat accuracy
- No movement differential
- No temperature drift
- Dustproof / water-resistant (IP67)
- LED indicator

Tool Setter



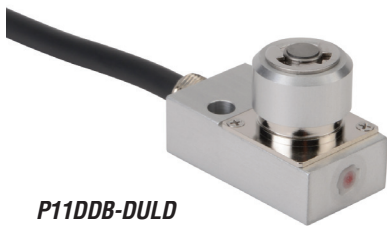
O indicates correct target approach and orientation.
 X indicates approach and orientation that should be avoided.

High Precision Touch and Tool Setter Switches Selection Chart

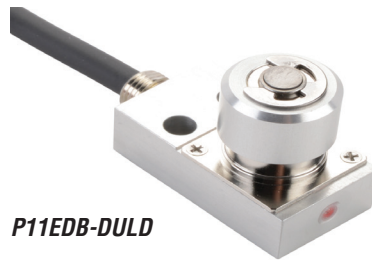
| Part Number | Price | Actuator/Head Type * | Barrel Type | Barrel Diameter/Thread | Stroke | Switching Output | Contact Force | Sensor Dimensions | Connection Type |
|----------------------|----------|-------------------------------|-------------|------------------------|--------|------------------|---------------|-------------------|---------------------|
| Tool Setter | | | | | | | | | |
| P11DDB-DULD | \$157.00 | Ø 16mm plunger, Ø 5mm flat | NA | NA | 3mm | N.C. | 1.5 N | Figure 1 | 3m (9.84 ft) cable |
| P11EDB-DULD | \$157.00 | Ø 16mm plunger, Ø 5mm flat | NA | NA | 5mm | N.C. | 1.5 N | Figure 2 | 3m (9.84 ft) cable |
| P21EDBP-22-28 | \$535.00 | Ø 18.5mm plunger, Ø 10mm flat | NA | NA | 5mm | N.C. | 1.5 N | Figure 3 | 5m (16.40 ft) cable |

* Ø = diameter

-xxLD: LED indicator (attached to sensor)



P11DDB-DULD



P11EDB-DULD



P21EDBP-22-28

Precision Limit Switches

High Precision Tool Setter Switches

Dimensions

mm [inches]

Figure 1
P11DDB-DULD

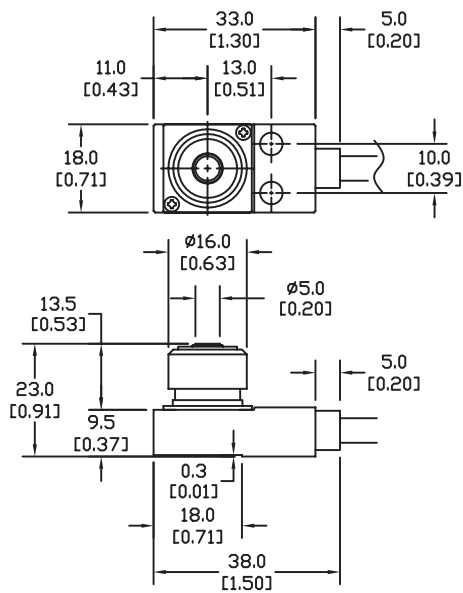


Figure 2
P11EDB-DULD

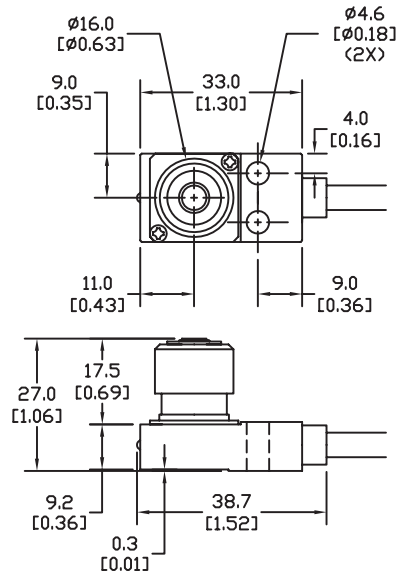
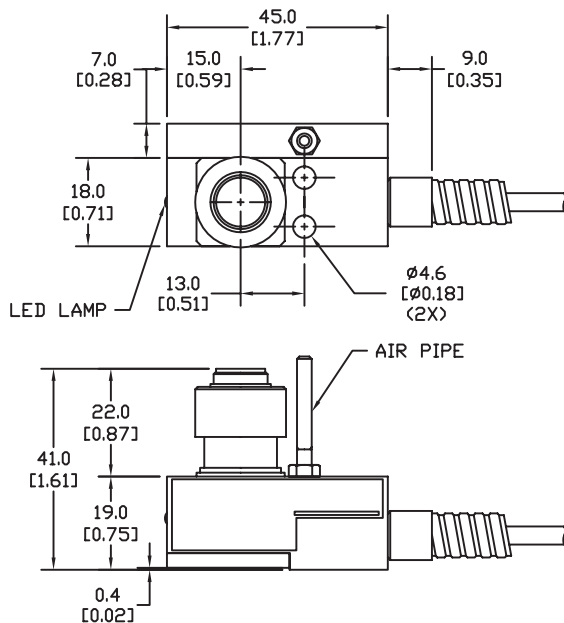


Figure 3
P21EDBP-22-28



Precision Limit Switches

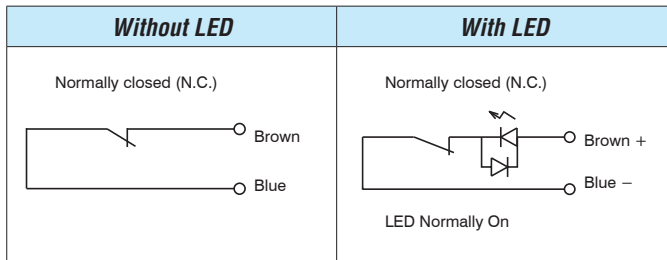
High Precision Tool Setter Switches

| High Precision Touch and Tool Setter Switches Specifications | | |
|---|---|---|
| | P11 | P21 |
| Environmental | | |
| Degree of Protection | IP67 | |
| Temperature Range | Operating: 0–80°C (32–176°F) (Ice-free) | |
| Mechanical Ratings | | |
| Enclosure Material | Aluminum | |
| Pretravel | 0* | 1st signal 0*, 2nd signal 2.5 mm (0.098 in) |
| Torque (for nuts on threaded barrels, set screws on smooth barrels) | N/A | |
| Oscillation | 10–55Hz total amplitude 1.5 for X, Y, Z each direction | |
| Impact | 300 m/s ² for X, Y, Z each direction | |
| Repeat Accuracy | Both On–Off, Off–On: 0.0005 mm (range)** | |
| Recommended Minimum Operating Speed | 10 mm/minute | |
| Electrical Ratings | | |
| Contact Life | 3 million operations | |
| Contact Voltage | 5–24VDC | |
| Steady Current Rating | 10mA or less | |
| Max In-rush Current Rating | 10mA (limit current to protect LED indicator) | |
| Connection Type | Cable: 3m (9.84 ft) oil resistant Ø5/2 cores (P08: Ø4/2 cores) Tensile strength 30N, minimum bending R7, 30AWG | Cable: 5m (16.40 ft) oil resistant Ø5/2 cores (P08: Ø4/2 cores), Tensile strength 30N, minimum bending R7, 30AWG |
| Indicating | -L: LED indicator (mounted in cable 120mm from the switch) | |

* Adjust the installed location of the switch by the signal switching point.

** At operating speed 50-200 mm/minute. Operating speed slower than 10 mm/min is not recommended.

Circuit Diagrams



P21 Wiring

